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Junior Scholastic

MARCH 18, 1953 • VOLUME 32 • NUMBER 7

Teaching Guides for This Issue

Industrial Research (p. 8)

Glass Works (pp. 8-10)

Stick to Your Math (p. 11)

Wizards of Chemistry (pp. 12, 17)

Bundle of Darts (p. 22)

Concepts Developed in Industrial Research Unit

The frontier days of the pioneer are still with us, but in a different form. Industrial research is continually showing the way to new job opportunities through new products.

Corning Glass and Du Pont are two companies which have discovered many new ways of making and using their products. They are among many big industrial companies which have apprenticeship programs for high school and college graduates who are interested in training for jobs with them. Those who prove capable may be chosen for specialized jobs in the plant. In many of the new industries, mathematics and science are of special benefit. But the general school record and character of each applicant is also considered.

Ways of Using Industrial Research Unit

The projects suggested here can be used as separate units or as a series of activities related to the articles on industry.

Aims: 1. To note that industrial research offers young people new worlds to conquer.

2. To fit today's happenings into the pattern of the expanding history of our country.

3. To gain appreciation of the need for basic school skills in future jobs.

Project I

To the class: When we speak of pioneers, we think of the early days of our country when people were establishing small settlements, clearing the wilderness, opening up the West. A pioneer is defined as one who goes before to prepare the way. Keeping that definition in mind, read the articles on pages 8 through 12. Then let us talk about some of our modern pioneers, what discoveries they have made, what new opportunities await us.

(Pupils and teacher talk about changes which have been effected in their own community or region. They might take one product made locally and trace it back, finding out what changes and improvements have been made.)

Project II

To the class: Columbus discovered America in 1492. A little more than 100 years later, the Pilgrims made a permanent settlement in Plymouth. Each of these was a great pioneering adventure, opening up new territory, new ways of life, new jobs for people. Review what you have learned of the history of your country and pick out other great pioneering events, giving their approximate dates. What were some of the outcomes?

(Pupils and teacher mention such instances as the banding together of the thirteen colonies to form a new country, opening up of the Northwest Territory, discovery of gold in California, sinking an oil well in Pennsylvania.)

The current subject matter being studied in Social Studies may be directly related to the unit on industrial research.

It may also be possible to correlate material being studied in Science.

Project III

To the pupils: The importance of math and science has been demonstrated and discussed in these articles. It has been assumed that you will have mastered the English that is needed. What are some English skills you will need? (Ability to write a good letter applying for a job or soliciting information, to fill out an application blank, to read and understand written directions, to express ideas orally.)

Mr. Brintell gives three things which the Corning Glass Works looks for in candidates for special jobs. Most firms probably want similar qualifications. Pretend to be a senior in high school writing a letter of application. You may select any job mentioned in the articles or you may prefer to apply to one of the other advertisers in *Junior Scholastic*. If so, read the ad carefully for information which will help you compose your letter. Maybe you have already fixed your eye on a future goal which is not among the subjects mentioned. Be sure you have sufficient information to write a good letter.

LOOKING AHEAD

Since we are pretending you are high school seniors, it is not necessary to stick to present facts about yourselves. You may give yourselves capabilities that you hope to have by that time. For example, as yet you may not have shown qualities of leadership. But in the next few years you may discover that your ability to take good pictures has made you forget your shyness to the extent that you can give informal talks to fellow members of the camera club.

When the letters are written, appoint three of your classmates as a committee to read the letters and select the most likely applicants on the basis of what they have written. They should be prepared to read the letters aloud and give reasons for their choices. Then the topic may be thrown open for general discussion. (The letters may be signed with fictitious names or left unsigned so the judges will decide on the merits of each letter without regard to the person involved.)

Application blanks for jobs, colleges, camps, subscriptions offer practice for many English skills. Necessary information must be condensed into a few concise words, questions must be read correctly, writing must be clear.

LOOKING AHEAD WITH JUNIOR SCHOLASTIC

Next Issue: March 25

Theme Article: Central Africa
World Friendship Series: How We Live in Kenya
Reading Feature: April Fool's Day
Special Feature: Picnics

No issue April 1

(Spring vacation interval)

Word Study

To the pupils: Each new product that is brought into being adds new words and word meanings to our language. So we have to expand our vocabularies to include these new words and know their meanings. Some, like nylon and "Dacron" we use frequently. Others, like spinneret or polymer are part of a special vocabulary not needed in everyday use.

Search through the articles on industrial research for new words and underline them. Read the sentence or paragraph in which they appear so you understand the meaning.

Then we will ask someone to list on the board those you feel we will use frequently and should learn to spell. Someone else may list the special vocabulary words and we will discuss their meanings. (When this is done, call attention to the different words made from polymer: polymerizer, polyester.)

Bundle of Darts

Aim: To show how it is possible to get general ideas from an article even when all the words are not known.

To the teacher: Pupils for whom reading is difficult lose interest when they must constantly struggle through word-by-word reading. Explain that most people find unknown words in their reading but instead of stopping to figure each one out, they continue to the end of the sentence or paragraph. Usually, by then the meaning is clear.

Suggest they read this story through silently to find the main ideas in it. You might write the words *quills* and *porcupine* on the board as you tell them: This story is about an animal whose weapon is his sharp quills—the porcupine. I'll give you the following clues to hunt for as you read:

1. The way the porcupine uses his weapon.
2. A word picture of a porcupine.
3. The kinds of food it likes.
4. Why a scientist likes them as pets.

When the silent reading is completed, gather the group around you and let them tell you what they have gleaned. Comment favorably on genuine effort even though the results are slight. If answers have not been found to all the questions, suggest they turn to their copies of *Junior Scholastic* and locate the section which gives the answer. For example: None of you found the kinds of food a porcupine likes. That's because he eats foods that are not familiar to you. What word clues will help you locate the paragraphs which will tell what he likes? . . . Yes, *food, eat, likes.* Does the paragraph have to start with one of those words? . . . Not necessarily. Look through your copies and see who can locate the paragraphs first. . . . John found the word *eats* nearly at the end of the paragraph. Turn back to the beginning of the paragraph and follow along as I read it aloud. . . . What other words were used instead of *eat*? . . . (*stuffs, is fond of, hardly ever touches, taps.*) But if you have found your clue word, *eats*, you can guess what some of the other words mean. Which words among the list of things the porcupine likes to eat were you familiar with? (Probably, *trees, grass, plants, meat.*) Now, Henry, will you read this same paragraph?

To the teacher: The purpose of the above is to encourage weak readers to venture beyond the words they know.

QUICK QUIZ

Ten Questions for a Five-minute Quiz

1. What is the name for the "darts" a porcupine is armed with? (Quills)
2. Which would be the most likely place to look for a porcupine: in a pond, in a tree, in a burrow? (In a tree)
3. In the last 40 years has the number of scientists and engineers in the U. S. increased, decreased, or stayed the same? (Increased)
4. Name the company whose "wizards of chemistry" developed nylon and "Dacron." (Du Pont)
5. For how long have men been making glass? (7,000 years)
6. Name the company which set up the first research laboratory in the U. S. glass industry. (Corning *or* Corning Glass Works)
7. Name the ancient Indians who built a 10,000-mile road system in what is now Peru and Ecuador. (Incas)
8. What is the name of President Eisenhower's plane? (Columbine)
9. A proposed tunnel across the Strait of Gilbraltar would link what two continents? (Africa and Europe)
10. Mexico recently gave the right to vote to what group in its population? (Women)

Answers to Quiz-word Puzzle, p. 31

ACROSS: 1-marsh; 6-western; 8-be; 9-E.E.; 11-calf; 14-apex; 16-Rio; 17-wed; 18-clean; 20-redwing; 22-re; 23-set; 24-in; 26-red; 28-all; 29-due; 31-art; 32-black; 34-mat.

DOWN: 1-me; 2-as; 3-rt.; 4-S.E.; 5-hr.; 6-wear; 7-need; 8-B.C.; 10-ex; 12-lice; 13-folds; 14-await; 15-Penn; 19-ewe; 20-reed; 21-gilt; 22-R.R.; 25-N.L.; 27-dub; 28-ark; 30-elm; 31-act; 33-A.A.

Answers to Citizenship Quiz, p. 28

1. QUILL QUIZ: 1-30,000; 2-cover its body from head to tail; 3-its tail is in the enemy's face; 4-drive quills into its enemy; climbing trees; salt.
2. A CLASS IN GLASS: 1-T; 2-F; 3-T; 4-T; 5-F; 6-T; 7-F; 8-T.
3. RESEARCHING INDUSTRY: 1-a; 2-c; 3-a; 4-b.
4. UNSCRAMBLING THE NEWS: 1-Peru; 2-Ecuador; 3-Incas; 4-Gibraltar; 5-Mexico.

Tools for Teachers

England

April 8 in *Junior Scholastic*

PAMPHLETS: *Britain* (Posters 20" by 30", Scenes in England, Ireland, Scotland, Wales), no date, free; *Contemporary Britain*, 1950, free; *John Britain-Postwar*, no date, free; British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. *The British Isles*, 1949, free; *Maps of the British Isles* (Area Folder No. 1); British Travel Centre, 336 Madison Avenue, New York 17, N. Y.

BOOKS: *Land of the English People*, by A. Street, $2.50 (Lippincott, 1946).

ARTICLES: "British Character Read in Tea Leaves," by R. Fleming, *N. Y. Times Magazine*, Dec. 7, 1952. "*It's No Fun to Be an Englishman*," by E. O. Hauser, *Saturday Evening Post*, July 5, 1952. "Youth and the World: England," by R. Angell, *Holiday*, Jan. 1953. "Stroll to London," by I. W. Hutchison, *National Geographic Magazine*, Aug. 1950.

FILMS: *British Farmer*, 12 minutes, sale, McGraw-Hill Book Co. *Traditional England*, 13 minutes, sale or rent, Films of the Nations, 62 West 45 Street, New York 36, N. Y. Landmarks in history, literature and legend. *Trade and Industry*, 20 minutes, sale, United World Films, Educational Film Dept., 1445 Park Avenue, New York 29, N. Y. London and Newcastle. *A Day with English Children*, 10 minutes, sale, Coronet Films, Coronet Bldg., Chicago 1, Ill. School and home life. *Trooping the Colour*, 10 minutes, sale or rent, British Information Services, 30 Rockefeller Plaza, New York 20, N. Y.

FILMSTRIPS: *Land of Britain: England*, 31 frames, British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. *A Visit to London*, 52 frames, British Information Services.

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Junior Scholastic

YOUR WORLD-VIEW MAGAZINE FOR SCHOOL AND HOME

VOLUME 32 • NUMBER 7 MARCH 18, 1953

Photo courtesy American Telephone and Telegraph Co.

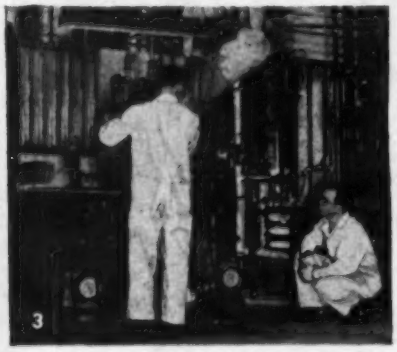
Science at work—to make telephone poles last longer

(See cover story, page 6)

SCIENCE IN ACTION

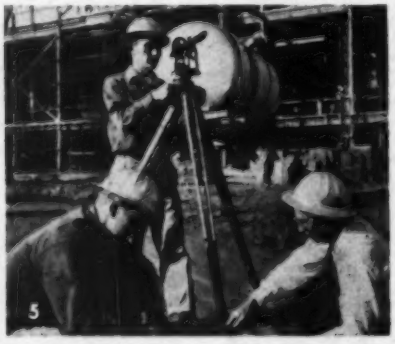
EVERYBODY'S INTERESTED when industrial science brings forth a new product like Du Pont "Orlon" acrylic fiber. (It resists the weakening effects of sunlight, mildew and corrosive acids better than other organic fibers—makes possible sturdier curtains, clothing and industrial filter fabrics.) But few people are aware of how such developments are brought about in today's industry. Here is how it is done:

THE IDEA may originate in one man's head. Then teamwork is needed to make it a reality. Usually chemists develop a small quantity of the product in the laboratory so it can be tested to see whether it is something that people will buy.



IF IT shows promise, the next step is to make larger quantities for more thorough testing. So Du Pont engineers set up a miniature manufacturing plant. When the process calls for unusual pieces of equipment, they often invent their own.

NOW WE'RE ready to design a full-size plant for all-out production. Scale models like this are carefully studied by engineers experienced in manufacturing problems, and by instrument designers, electrical and power supply specialists, etc.



BUILDING THE plant is also a job for Du Pont men, for the Company does its own construction work. The services of civil, chemical, mechanical, electrical and other graduate engineers are required. They may also set up production lines.

EVEN WHEN the plant is built and the product marketed, Du Pont scientists continue to look for new ways to use it, and methods for making it better and cheaper.

Industrial research never ends. Right now hundreds of different projects are under way in the Du Pont laboratories . . . in scores of different fields, ranging from electrochemicals to rayon, from finishes to film. One of these days, with the right college training, *you* may join a Du Pont research group and participate in discoveries greater than any of the past!

Questions students ask Du Pont

How many kinds of engineering are there?

—G. V. C., Illinois

Modern industry uses the services of men and women specializing in more than 100 different engineering fields—in everything from ceramics and instrument design to forestry and building materials.

Where do Du Pont scientists make their headquarters?

—A. L. MacC., New Jersey

Eight of the Company's research groups are located in Wilmington, Del. Other laboratories are located in 11 states, from Connecticut to Texas. Scientists also work in sales offices or plants in 25 states.

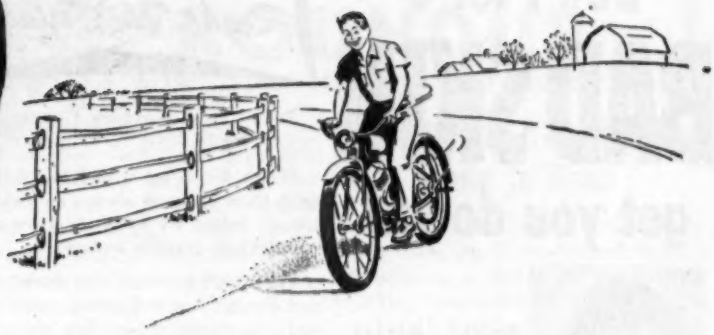
Send your question about career opportunities in science to *Science in Action*, 2521 Nemours Building, Wilmington, Delaware.

DU PONT

REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

E. I. du Pont de Nemours & Co. (Inc.)



THE DOUBLE EAGLE

Spring Ahead

on the best by Goodyear

THE STUDDED TREAD

To get the *best* out of your bike this spring—you need tires that are especially made for quick starts, high-rolling speeds and fast stops.

The Double Eagle is just such a tire. For it has a double strength cord body that provides extra toughness and stamina. And its deep-cut diamond tread blocks really grip the road to help you hold your course, bring you to safer, straight-line stops.

The Studded Tread is an equally efficient performer. The sturdy studs in its tread and shoulder assure dependable, road-holding action in mud, snow, rain or off-the-pavement travel. And its bruise-resistance means extra miles for you.

Either is a good choice for smooth, trouble-free cycling. Your neighborhood Goodyear dealer has them now.

Goodyear, Cycle Tire Department, Akron 16, Ohio

You can count on Goodyear Butyl Bike Tubes, too. They hold air longer, and are harder to puncture.

Always ask for

GOODYEAR *bike tires*

MORE PEOPLE RIDE ON GOODYEAR TIRES THAN ON ANY OTHER KIND

Double Eagle—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

Don't let a BAD SKIN get you down!

Boys! Girls! Want to be popular? Of course, you do! Every normal human being wants to be liked and admired!

When teen-age skin problems threaten to spoil your good times, here's real help! Try this new way of cleansing your face with *medicated* Noxzema and water!

Teen-agers all over the country are thrilled with the way it helps heal externally-caused blemishes and helps skin look so much more attractive. See for yourself tonight:

1. Cleanse thoroughly—with Noxzema and water! Then just apply Noxzema to your face and neck; wring out a cloth in warm water and wash as if using soap. Notice how clean your skin looks! How much better it feels! Not dry or drawn!

2. At bedtime! Apply Noxzema over your whole face. You'll like its cool, pleasant tingle. Noxzema is not gummy! Not sticky! Doesn't show! Always pat a bit extra on any externally-caused blemishes to help heal them, fast! It's *medicated*. See if you don't notice a big improvement as you go on using this famous *greaseless, medicated* formula!

3. In the morning, wash again with *greaseless* Noxzema and water. Then apply Noxzema lightly over your whole face. It helps protect your skin all day—it's greaseless—no shiny nose.

Generous trial offer! Get regular 40¢ size for only 29¢ plus tax—at any drug or cosmetic counter. After you prove for yourself how Noxzema helps heal problem skin and helps *keep* your skin looking smooth and attractive, you'll always want to buy the big thrifty 10 oz. jar—only 89¢ plus tax.

Right This Way

A boy from Camden County High School, South Mills, N. C., writes:

When I call up a girl to ask for a date, there's almost always an awkward silence before we hang up. How can I end the conversation naturally?

When you have nothing more to say, and the girl doesn't either, you might end the conversation this way: "I'm glad you can go, Jeanie, and I'll pick you up at eight on Friday." Wait for a word of agreement from her, and then say "Good-bye." Or, just before you hang up, you might say that you'll call her later in the week to make more definite plans. Or, if she couldn't accept your invitation, tell her you're sorry and that you hope you can get together soon. All of these are natural ways to end a telephone conversation. And short talks on the phone can be just as friendly as long ones.

A girl from Jane Addams Junior High, Seattle, Wash., writes.

My sister is always borrowing my clothes without asking. Then, when I want to wear them, they're dirty or something. What can I do to make her stop this?

Talk over the matter calmly with your sister. You might say: "I'll let you borrow my clothes if you ask me first, if you'll do any washing or mending that's needed before you return them, and if you promise that they'll be on hand when I want to wear them." Or you might agree to "swap" clothes with her for different occasions. If you discuss the problem peacefully, and if you are as considerate of your sister's belongings as you'd like her to be of yours, then your wardrobe worries should come to a happy end.

If they don't, try taking the matter up pleasantly in a family council.

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NEWS ROUNDUP

Russians Jam Moscow For Stalin's Funeral

Thousands of people poured into Moscow, capital of Russia, to see the funeral of Joseph Stalin. The man who had been dictator of Russia for 29 years died March 5. To many simple Russians, he seemed like a god.

A cobbler's son, Stalin studied to be a priest in his youth. But he soon broke away from training to go into politics. One steady drive pushed him on to success—the drive for power. When he died, at the age of 73, Stalin had become one of the most powerful men in the world.

But Stalin did not use his power for the good of all. He did not think other people had any value. If anyone opposed him, that person was put to death or sent to prison. On his orders whole groups of people were killed. His word was law.

Stalin did not believe in freedom or democracy. He believed only in power—power for himself, power for Russia, power for communism. He did whatever was necessary to gain this power. Historians say he caused the deaths of more people than any other man in world history.

In Russia, Stalin ruled 215,000,000 people with an iron hand. Russia, the world's largest country, is three times as big as the U. S. in area. But both countries have about the same amount of good farmland. Russia's industrial output is a quarter of ours.

Russia covers a sixth of the world's land area. It is as large as all of South America. Its surface is equal to the moon's surface.

But Russia's huge size was not enough for Stalin. Step by step he spread his power beyond Russia's borders. With Russia's help, Communists have taken over a number of other countries. The Communists in these countries take orders from Russia. So Russia runs them, too.

All told, 800 million people—about one third of the world's people—are ruled by Russia.

(See column 3 for news of Stalin's successors.)

Puerto Ricans Build Bridge To Solve Serious Problem

"Where there's a will, there's a way." With that saying in mind, 40 families of a Puerto Rican village solved a serious local problem.

The village, Palo Hincado, is about 2,500 feet above sea level on a steep mountain. The nearest school is a half-mile away across the swift Canabon River. Often flash floods destroyed the weak wooden bridge, which spanned the river.

Pupils from Palo Hincado sometimes missed 40 days of school a year while the bridge was out. And farmers were delayed in bringing their crops to market at neighboring towns.

The villagers decided to build a concrete bridge of their own. They rounded up sand, wood, steel, and other materials. A committee drew plans for a 58-foot bridge. Sixty men built it in 22 days of hard work. Today residents of Palo Hincado have no trouble crossing the Canabon.

Malenkov Is Top Man Now Stalin Is Dead

Russia's new dictator is Georgi M. Malenkov. He is top man of Russia's Presidium, a group of the highest ranking Communists. The Presidium makes all decisions for running Russia and the Communist party.

Malenkov, 51, has hated the Western world all his life and has never been outside Russia. He moved up fast in the Communist party and served as Stalin's secretary for 20 years. Malenkov also was put in charge of Russian factories. He sent thousands of Russians to their death for missing a few days of work—even when they had been sick. Stalin praised him as the most loyal of all Communists.

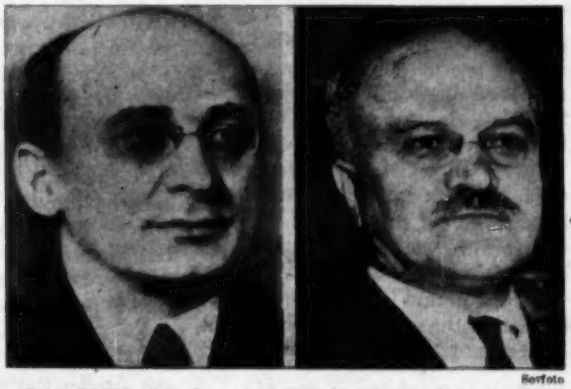
Two other top Communists who will help boss Russia are:

Lavrenti P. Beria, 53. As Minister of the Interior he will remain in charge of Russia's dreaded secret police. They keep close tabs on Russian homes and factories. If they report a Russian as being disloyal to Communism, Beria orders him sent to a slave labor camp. He is said to have put millions of Russians in such camps. Beria's name stands for terror in Russia.

Vyacheslav M. Molotov, 63. As foreign minister he will be in charge of guiding Russia's foreign affairs. Molotov is known for his ability to anger foreign diplomats. He insults them or makes long speeches to get his way. He was one of Stalin's most loyal supporters.

United Press

Malenkov (left), new top Russian, shown at parade with Stalin.



Sovfoto

Beria (left) and Molotov (right) now rank second and third.

Photo from Aetna Casualty and Surety

Photo shows behind-the-wheel class watching screen and "driving." Drivetrainer was developed by Aetna Casualty and Surety Co. and lent to New York school.

"Behind the Wheel" Is New School Course

"Behind-the-wheel" driving—that's what students in the photo above are learning and practicing in their classroom. The new course is being tried out at the Brooklyn (N. Y.) High School of Automotive Trades.

Each student sits behind the wheel of a one-seater "car," a machine called the Drivotrainer. It has all the controls needed for driving a car—and makes all the sounds. Its electric motor hums and its gears grind. It stalls, too.

After starting his car and "cruising" a while, the student driver watches a movie screen at the front of the room. A film comes on showing a highway as seen from a moving car. The student driver is supposed to be driving that car.

Instructions flash on the screen: "Take left fork." "Signal." "Get in proper lane." "Check for traffic." The student has to follow these instructions and many others. Every move he makes, right or wrong, is recorded by the Drivotrainer. At the end of the "trip," it shows if he shifted gears too fast, failed to stop at a red light, braked the car too suddenly, took a wrong turn, parked poorly, and so on.

A class period lasts 40 minutes. At the end of the semester, each student must pass a 25-minute "road test." If the new course is successful in teaching good driving habits it may be used in high schools across the U. S. About half our nation's high schools now give driver-training programs.

★ Means word is defined on page 24.

COVER STORY

Across the U. S. stretch millions of miles of telephone wires. Millions of poles hold them up. Those poles must be kept in good condition. If they are damaged, or if they start to rot, they must be replaced. With millions of poles, that's a big job. It runs into a lot of money.

That's why the American Telephone and Telegraph Company is constantly seeking ways to make the poles last longer. If each pole lasted just one year longer than it now does, a huge amount of money would be saved.

The young woman on *Junior Scholastic's* cover works in the Bell Telephone Laboratories. Part of her job is studying how different chemicals help to preserve wood.

Inside the sealed jar is a piece of wood. It has been treated with certain chemicals. It is also under attack by fungi★. The sealed jar prevents other elements from affecting the experiment. Through such experiments, scientists can learn how best to protect the wood in telephone poles.

(For more on industrial research, see articles starting on page 8.)

MEXICAN WOMEN WIN EQUAL VOTING RIGHTS

Mexican women have won the right to vote in all elections.

Mexican women have been gaining equal rights with men slowly but steadily since the 1920s. In recent years more and more women have been encouraged to take jobs in industry and in professions. Many have done well.

In 1952 a group of Mexican women got together to press for equal voting rights. Soon 28 other women's groups, with a total of 1,400,000 members, joined the drive. The women held many meetings and parades in towns and cities.

Late last year Mexico's congress added an amendment to the constitution. It states that ". . . women, married and single, are citizens of the republic . . ." When President Adolfo Ruiz Cortines recently signed the amendment, women won the right to vote.

The women are now seeking still other equal rights. They want changes in laws on marriage, inheritance, education, and so on.

Gog and Magog to Return; All London Welcomes Them

Gog and Magog soon will be back in London again. New statues of the two popular giants are being carved. They will stand nine feet three inches high in front of London's Guildhall building.

For many people, London just isn't London without Gog and Magog. The statues were probably put up during the reign of Henry V (1387-1422). Both were destroyed during London's great fire of 1666, when four fifths of the city was laid in ashes.

The new statues of Gog and Magog were carved in 1708. These were smashed to bits in a big German firebomb raid in 1940 during World War II.

No one knows exactly who Gog and Magog were. Some people say they represent a race of giants who once fought against the British. Two of the giants, Gog and Magog, were captured and brought to London as slaves. They were chained to a royal palace to serve as porters.

The names Gog and Magog are also mentioned in the Bible.

News in a Nutshell

The "Columbine" is the new name of President Eisenhower's official plane, a U. S. Air Force transport. The President named the plane in honor of Colorado's state flower, a columbine. Colorado is Mrs. Eisenhower's native state. The columbine is a bright-colored flower with cone-shaped petals. Former President Truman had named his plane the "Independence." President Roosevelt named his the "Sacred Cow."

1952 was a year of safe travel on U. S. trains and planes. Railroad officials say it was the safest year in railway history. No passengers were killed in any U. S. train accidents. And for the first time since 1940, a full year went by without a single passenger death on planes of scheduled airlines. U. S. planes took off at the rate of one every seven seconds. They carried a total of 25,280,000 passengers.

Tramps can find jobs tramping in Denmark. A man who makes rubber soles hires the tramps to test the soles. The tramps tramp along the coast, covering about 20 miles a day. They say they like the job because it's "in line with our work."

A tunnel linking Africa and Europe someday may be built under the Strait of Gibraltar. The Strait is a narrow body of water which connects the Mediterranean and the Atlantic. The Strait separates the southern tip of Spain from the northern coast of Africa.

The tunnel would be built at the Strait's narrowest point, a distance of 23 miles. Small electric trains would make a trip through the tunnel in about 20 minutes. Each train would be able to carry 140 passengers and 100 tons of freight.

A Spanish inventor is drawing up plans for the tunnel. He is the man who invented the Talgo, a speedy lightweight train.

Champion tea drinker – that's Charles F. Hutchinson of New York, N. Y. He has sampled all tea shipped through the port of New York in the last 40 years. During that time he tasted about 11,000,000 cups of tea. Recently he retired from his job as a U. S. Government tea taster.

Science News

Junior Scholastic map

Heavy black lines show the Inca roads being explored by U. S. scientists.

Exploring Inca Roads

A long network of ancient roads in South America is being explored by a group of U. S. scientists. Incas of Peru built the roads about 700 years ago. Remains of the road today cover more than 10,000 miles. They stretch across Ecuador and Peru (see map) into Chile and Argentina.

The scientists are traveling by foot, llama*, and jeep across the rugged highlands of the Peruvian Andes. For two years they will study the roads to learn more about how they were built.

Modern engineers rate the Inca roads as one of the greatest highway networks of all times. The roads consisted of two main sections across the Inca empire. One ran through the Andes, over peaks 13,000 feet high. The other wound along Peru's coastal desert.

The Incas used huge stone blocks to pave the roads. Some roads, high in the mountains, had low walls on each side. Natural obstacles* could not stop the Incas. They dug wide tunnels through solid rock. They threw "suspension" bridges made of vines and willow branches across chasms*. Sections of the roads were built on balsa* pontoons across lakes and wide rivers.

The roads were used mainly for hauling farm produce and for communications. Swift runners carried messages for the Inca rulers. The runners, in relay*, could cover 1,500 miles in four days. Every two miles or so along the road, small "post-office" huts were built for runners.

Man-made Rubber

A new, fast way to produce man-made rubber is being developed by U. S. scientists. Chemicals used for making rubber are poured into long stainless steel pipes. The chemicals are heated for 15 or 20 minutes, becoming rubber. Then the rubber is forced out of the pipes. Under the old method rubber is made in huge vats. It takes 10 to 12 hours to stir and cook the chemicals.

The new way, still being tested, will cut down the cost of turning out man-made rubber. Scientists of the B. F. Goodrich Chemical Company developed the new process.

News from the "Haddock"

"So far, so good." That's how the 23 men aboard the *U. S. S. Haddock* described their health after six weeks of being sealed in the sub. The U. S. Navy is trying to find out how long a crew can stand being shut up in a submarine. (See *Junior Scholastic*, March 4.)

Doctors examine the crew members every day. "The men are in fine shape mentally and physically," reports one doctor. "They read a lot and enjoy watching movies and TV shows. No one is cranky. All of them have a craving* for cottage cheese, but we don't know why yet."

World's Brightest Light

The world's brightest light has been flashed on by British scientists. It comes from a six-inch tube filled with xenon, a rare gas. The "lamp" provides a flash of 1,000,000 candle-power to the square inch. But the flash lasts only one twenty-fifth of a second.

(The sun gives out about 800,000 candle-power of light to the square inch–day after day.)

Eye doctors hope to make use of the bright flash. They plan to take color photographs of eye tissues.

Glass Works

By STURGES F. CARY
Associate Editor of Scholastic Magazines

Corning Glass Works photos

This glass block is so clear that it looks as if it were a hollow tube.

WHAT can you do with glass? The answer used to be "not much." Men had been making glass for 7,000 years. But they hadn't done much with it except make glasses and jugs, windows and lenses. Today scientists have opened up a whole wonder world of glass.

One place where you can see some of the many types of glass now being made in the U. S. is the Corning Glass Center, in Corning, N. Y. There you can see:

Glass so springy it's used to make diving boards.

Fiber glass that can be woven on looms.

Glass doors as black as ink, and glass that's so clear you can read a newspaper through 10 feet of it.

Glass you can cut with a knife, and glass that's as heavy as lead and will stop atomic rays.

Glass that can be used as stuffing to make life jackets float.

Where did all these new kinds of glass come from?

A lot of them were born in a four-story building set in the middle of the bustling factory area of Corning Glass Works. Opening off its glass-brick corridors are labs where men in white coats move amid a forest of complicated apparatus. In book-crammed offices, scientists ponder their latest ideas for an all-glass world.

Corning is one of our nation's largest glass factories. Its story is an example of science and industry working hand-in-hand.

BIG CHANGES IN 75 YEARS

Seventy-five years ago, Corning Glass Works had no scientists. Only about 100 people worked there. They made tableware, lenses, and lamp chimneys. The workers were craftsmen who shaped glass by hand.

Today the company employs 14,000 at Corning, N. Y., alone. The big change started when Corning called in a scientist to help solve a problem. At that time railways were complaining about their signal lamps. A signal lamp has a lens which works like a prism. It concentrates the light in one direction. The trouble was that the prism was molded on the outside of the lantern lens. Dirt and snow collected on the outside of the awkwardly shaped lens and cut off the light.

Corning turned to a professor at Cornell University. He helped the factory design a new lens with the prism on the inside. That left the outside surface smooth and easily cleaned. Dirt no longer cut off the light.

Soon Corning had to turn to another scientist for help. The railways wanted to improve their signal lights. These lights tell a railroad engineer what lies ahead of him.

Many of the color signals had something wrong with them. For example, there was a red signal which was fine in clear weather; but you couldn't see it through fog.

Corning worked out glasses for a new and improved system of color signals. In 1907 every railroad in the U. S. and Canada started to use the Corning system.

FIRST GLASS RESEARCH LAB

By this time Corning had learned how much scientists could help the Works. In 1908 the company set up a research laboratory. In this laboratory, scientists could experiment with new ideas for glass. It was the first research laboratory in the U. S. glass industry.

The research laboratory started to pay off right away. Once more Corning was getting complaints from the railroads. The railroads said that the lanterns used by their trainmen broke in rain or snow.

The problem was an old one. It arose from the way certain materials behave when the temperature around them changes. Glass, like metal, expands when it's heated and shrinks when it cools. So what happened was this: The flame in the brakeman's lantern heated and expanded

Industrial Research: What Is It?

Where did your clothing come from? Where did your radio come from? Where did your pencil, furniture, paper come from? Probably they all came from a store. The store got them from a factory. The factory got its materials from other factories, farms, forests, mines, and other places. Many hands and many skills took part in making the product you bought.

Somewhere along the line scientists had a hand in making that product. These scientists work in industrial research. Day after day they experiment with new products and with new ways to make old products. Their aim is to give us better products at lower cost.

Forty years ago it was hard to find an industrial research laboratory in the United States. Today there are 3,300 such labs, employing 165,000 people. Some belong to large companies; some work for many companies; some are part of universities.

"Glass Works" tells you about the research which goes on in just one company. In countless companies, the country over, the same search is going on for better products and better ways of making them.

the *inside* of the glass. Rain or snow, beating on the lantern, chilled and shrank the *outside*. This pulled the glass apart.

"We'll have to make a new kind of glass," Corning's scientists decided. They tried adding boric acid to the glass mixture. It worked! The new glass didn't shrink or expand much with temperature change. A brakeman could be sure that whatever the weather his lantern would shine steady and true.

COOKING IN GLASS

The lab kept improving this glass. One day, in 1915, a scientist took a jar made from this glass home with him. The next day he came to work and passed around a cake cooked in the jar.

That was the first time anyone had ever thought of cooking in glass. Today, of course, there are glass cooking utensils in nearly every kitchen.

And Corning goes on "cooking" new glasses. For thousands of years, the only way known to make glass was to mix sand, soda, and powdered limestone and melt them together. (This is still the commonest and cheapest kind of glass.) But Corning stirred in all kinds of other materials. Corning's "glass cookbook" has 50,000 different "recipes."

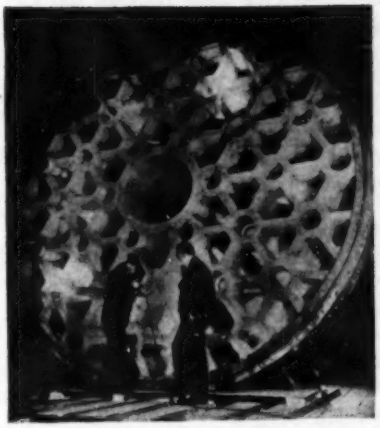
In 1948 Corning produced a new "recipe" to help the U. S. out of a fix. The country was short of lead. We couldn't dig or import enough lead to satisfy the appetite of our factories. Lead glass had been used in TV tubes. So many TV sets were being made that there wasn't enough lead to go round. Corning's laboratory solved the problem. It made a lead-free glass to do the job in TV sets.

SHAPING GLASS

Finding the right sort of material to make glass is only part of what Corning researchers do. Handling and shaping glass is just as important. Corning has made tremendous advances in finding new ways to shape glass.

In the old days glass was sometimes shaped into molds by hand, sometimes by a man blowing air into it.

You can still watch that being done in one of Corning's factories. First the ingredients are heated in a furnace until they're molten hot. Then the glass can be shaped easily.



This 200-inch disc is largest single piece of glass ever made. It is used for the mirror of the world's largest telescope, at Mount Palomar, Calif.

A man called a "gatherer" dips a long metal rod into the furnace and pulls out a glob of the molten glass. His rod is hollow and about eight feet long. The gatherer lays the glob of glass into a mold. The mold is the shape which the glass has to take.

A master blower then takes over. He blows down the hollow tube into the glass. As air comes into the glass, it expands. When it fits exactly into the mold, the master blower stops blowing. (Sometimes the molding is done with tools instead of air.)

Until 1903 only the master blower's lungs could put air into a piece of glass. Then Michael Owens, an Ohio glass worker, made an invention. He used compressed air* to blow glass into shape. Today machines can shape glass into practically every form that's wanted. The old hand-and-blow method is now used only for special jobs. Sometimes only a few pieces of glass of a special shape are wanted. Then it's not worth building a machine to do the shaping. The gatherer and master blower go to work as they used to do in the old days.

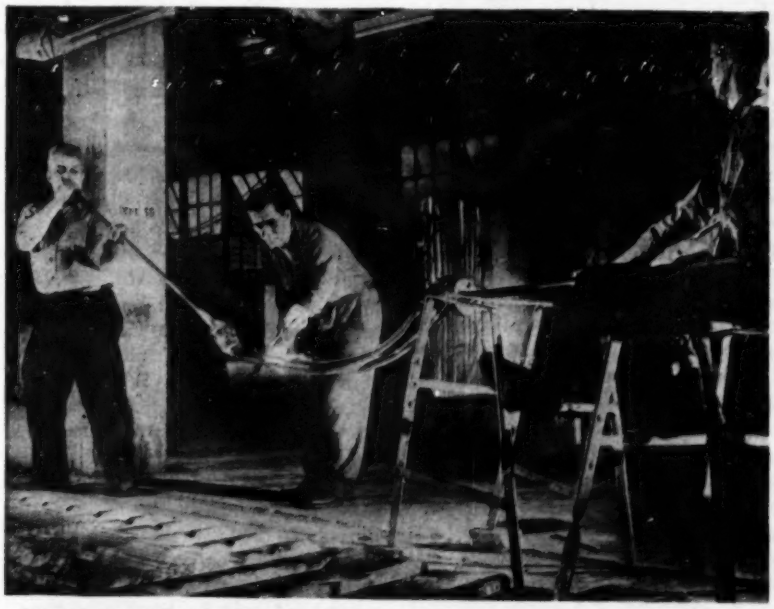
Corning's biggest marvel of machinery is in its bulb factory in Wellsboro, Pa. The machine nips bits off a flowing ribbon of molten glass. Compressed air then blows these bits into electric light bulbs—1,000 every minute.

NEW PRODUCTS

Dr. Edward Condon, the Director of Research at the Works, says, "Sixty per cent of Corning's business is in products that didn't even exist commercially ten years ago." That's how quickly the glass industry is racing forward.

Corning uses most of its researchers to work out the details of practical problems. But it keeps some on

* *To compress* means to force into less space; to squeeze together and make smaller by pressure. When compressed air is released, it expands with great force and can be used for many jobs, such as operating drills, brakes, etc.



MAKING A THERMOMETER TUBE: Blower keeps glass tube open while backing away and drawing glass out. Middle man is measuring diameter of the glass tubing.

Some work, such as this complicated glass pump, is done by hand. With his torch, glass, and tools, this man adds to and shapes the laboratory apparatus.

long range research, planning new inventions in glass.

Dr. Condon says: "If we could only get more trained people, we could keep more men at work on this long-range research. But there's a great shortage of technically trained workers. Young people can help create America's future by preparing themselves for jobs in industrial research."

Now let's see what one young man in Corning is doing about that.

MEET CURTIS NEUNER

The young man is 24-year-old Curtis Neuner. He has just graduated from the Corning Works' apprenticeship† class. Now he's on his way to an important job in the glass industry.

Curtis is a machinist. A machinist is a man who helps make the machines which turn glass into the shapes that are wanted. In other words, Curtis helps make the tools which then make Corning's glass products.

"From the time I was 13," Curtis says, "I worked summers in a machine shop. I had my own little shop at home. I signed up to work at Corning Glass because I was promised a chance to become an apprentice.

"After I joined Corning, I worked in the machine shop for about a year before an opening came as an apprentice. The Glass Works picks apprentices pretty carefully. Nearly 200 trainees have gone through the apprenticeship program. All but two of them have stayed in the Glass Works. To get picked as an apprentice, you have to have a high school education. You also have to have a good record at the job you've been doing.

"The apprenticeship course lasts four years. I put in at least 8,000 hours while I was going through it, working in all parts of the machine shop. I also went to classes four hours a week. I studied mathematics, metallurgy (the science of working with metals), physics, economics, and other subjects to help me prepare for a career at Corning."

TOWARD DESIGNING

For the next two years, Curtis will work at building tools and machines in the Works' machine shop. If he does well, he may then get more advanced training. His next step is to become a machine designer. A machine designer actually designs the machines which turn out the finished glass products.

The apprenticeship course is only one way to advance in the glass industry. There are plenty of other ways. There are about 250 glass factories in the U. S., employing about 125,000 workers. Corning has 14,000 workers in its various branches. All the plants in the U. S. are looking constantly for skilled technical workers. They are also on the lookout for young people to do beginners' jobs.

TRAINING PROGRAMS

In Corning the search starts with high school boys and girls. The Glass Works is the only large industry in Corning. Many of the town's young people go to work for the factory. One local high school acquaints its boys with glass in the school's own "glass shop." There the students melt and handle glass in a small furnace to get the "feel" of the material.

A boy out of high school usually starts in at Corning as a helper on a job. He is paid by the hour. He can work into more skilled jobs, such as operating a machine or a glass melting tank. One way he can get ahead to more responsible positions is to sign up for the "general training" program. Those who pass the necessary tests and interviews are admitted to evening classes on their own time. They study the company's organizations and products and the problems of supervising others. From "general training" graduates, Corning picks many of its men for supervisory positions.

Corning hires girls, too, to do clerical and secretarial work. Girls in Corning high school business classes get a chance to look over machines used in the Works' business offices. There they can see what kinds of jobs they can do in the offices.

The Works hires dozens of college-trained men every year too. These college graduates get a year's training in the Works. They attend classes, visit various departments, and take a "supervisory candidate" class. They may become executives, the people who actually run the plant's operations.

CHOOSING CANDIDATES

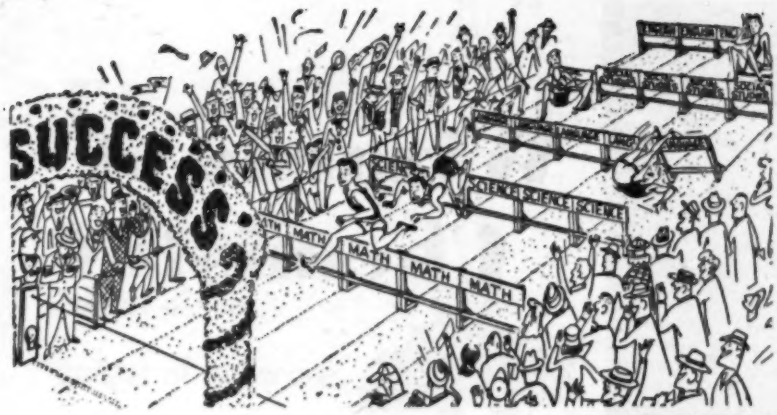
How does Corning pick workers to do specialized jobs? Arthur Brintnall, who helps do the picking, says that the company considers three things about candidates for these jobs. It considers:

1. The candidate's school work.
2. His natural ability to learn the job. Corning determines this by giving the candidates special tests.
3. His possibilities as a leader. Mr. Brintnall thinks that the best clue to what kind of leader any boy will make is what he's done so far.

"We want to know," says Mr. Brintnall, "how he did in the high school courses he took. We're also interested in the way he got along with his schoolmates. And we want to know what qualities as a leader he showed in school."

Twenty miles of glass tubing went into the walls of this S. C. Johnson & Son, Inc., new research center, Racine, Wis.

† An *apprentice* is a person learning a trade. *Apprenticeship* is the state of being an apprentice.



Cartoon by DeWolfe Hutchins

Stick to Your Math

By CHARLES LANG

Vice-President in Charge of Public Relations, General Electric Company

HOW much math are you taking? Unless you're different from most people, you should take plenty. Chances are that you'll have to know math for your job when you're through school. If you don't need math for your job, you will need it to understand the inventions and gadgets which surround us wherever we go.

Forty years ago, things were different. Automobiles were just starting to be produced. Airplanes were a novelty. There was no television, few radios. Most homes had no electricity. People got their light from oil or gas. They cooked on a wood, coal, or gas stove. There were no air-conditioning systems, no refrigerators, no washing machines.

In those days there weren't many scientists and engineers; they weren't needed. In 1910, more than a third of all employed persons were unskilled. They needed little education. They worked mostly with their muscles, not with their brains. Today only one fifth of all workers are unskilled. In 1910, only one worker out of every 621 was an engineer. Today it's one out of every 139.

WE NEED TRAINED PEOPLE

Every year we need more specially trained people. We used to think that a radio service man had a pretty special kind of training. But a TV service man has to know a lot more. It's the same in many other jobs. Only highly trained specialists can work out today's tough industrial problems. The men who get energy out of atoms, or search for ways to conquer disease, or design the latest labor-saving gadgets have to know more than their fathers did.

Suppose you want to be one of these specialists—an engineer, a scientist, or a designer. Then you've got to start preparing right now because there's so much to learn. You prepare by learning the subjects you have to know. One of these subjects is math.

But suppose you don't want to be a technician or scientist. You may still need math for your job. To be a druggist, for instance, you have to be a chemist. That means you have to study chemistry. And you can't study chemistry unless you understand algebra.

NEEDED IN NURSING

You might want to be a nurse. If you're training to be a nurse in a modern hospital, one subject you have to take is Materia Medica. In Materia Medica you'll learn how to figure out doses and solutions of medicines and drugs. You have to know algebra to do the figuring. Plenty of nurses flunk their training courses because they don't know enough math.

Maybe you want to be a musician or a writer. You don't need much math for that. But whatever your career may be, you'll be using modern inventions like automobiles or TV in your spare time. To understand something about how they work, you'll have to know math.

You even need math to understand things that don't seem scientific at all. What makes rain or snow? Why do mirrors reflect light? Why does the earth go round the sun? Why do the prices of some things you buy go up, and the prices of others go down? We'd all like to know the answers to some of these questions. And you can't understand the answers unless you know math.

Math has another advantage, too. It helps you to study other subjects—like history, or geography, or government. You can't learn any of these subjects unless you can think clearly and well. Math helps you learn how to do this. Remember what your math lessons are like. You get problems to work out. Solving those problems trains you to think along from one step to the next until you reach the answer. That training is a tool.

USEFUL TOOL

You might compare this tool to a wrench. A wrench unfastens nuts whether they're in a motor or a typewriter or anywhere else. In the same way the training you get from math helps you think out problems in many subjects. Of course a wrench can't do the job of a screwdriver. Neither can training in math help you solve every problem. But it can help in plenty of them.

So whatever your career or interests may be, studying math is not a waste of time. And for many careers, math is a must. There aren't enough trained people to go around. The jobs are there, waiting for boys and girls when they get out of high school or college. If you want to make job hunting easier for yourself, study math. You'll need:

Lots of math to be a: geologist, aeronautical engineer, research scientist, marine engineer, ceramic engineer, surveyor, chemist, mechanical engineer, electrical engineer, architect.

More than average amount of math to be a: nurse, accountant, patternmaker, teacher, merchant, physician, machinist, draftsman, airplane pilot, commercial artist.

Just a little math to be a: clergyman, telephone switchboard operator, lawyer, baseball player, farmer, photographer, reporter, filling station attendant, policeman, fireman.

Du Pont photos

Wizards of Chemistry

Bob Forney is a young man, but he is moving rapidly ahead in man-made fibers. It's a field with big opportunities.

MAN'S clothing, throughout most of history, has come from nature. There's cotton from the cotton plant; wool from sheep; linen from flax; fur from animals. But in recent years a big change has taken place. We've started to get clothing from the scientist's test tube. Out of the laboratories have come man-made fibers★ to be woven into clothing.

Some of the best-known man-made fibers come from E. I. du Pont de Nemours and Co. Among the fibers they make are nylon and "Dacron" polyester. (We'll explain later in this article how polyester products are made.)

People want more of these fibers than Du Pont can turn out right now. But you'll be finding more and more of these fibers in stores. Du Pont is increasing its production so that people can buy as much as they want. One of its new plants is in Kinston, North Carolina. In this plant, Du Pont will be turning out large quantities of "Dacron."

NYLON IS STRONGEST

The different fibers Du Pont produces have different qualities. Nylon is the strongest fiber now being made. It is used widely to make hosiery, lingerie, and other clothes and goods. Like nylon, "Dacron" is easy to wash and dries quickly. "Dacron" usually does not need to be ironed at all after washing.

Recently Du Pont invited *Scholastic* reporter Bill Favel to visit the "Dacron" plant in Kinston. When he arrived at the plant, the reporter was shown into the office of Dr. Russell Peterson. Dr. Peterson is a chemist in charge of technical activities in the Kinston plant.

"We want you to spend the day with Dr. Bob Forney, a young chemical engineer," said Dr. Peterson. "The career story of Bob and the success story of 'Dacron' go together. Bob hasn't been out of college three years yet. But already he's a plant research supervisor. He has a promising career ahead of him. So have many of our other young scientists and engineers. The man-made-fiber industry is growing so fast that there are many opportunities for young men to be promoted to top jobs." Bob has forged ahead with the development of "Dacron."

BOB'S CAREER

Bob Forney was born in Chicago, Ill., in 1927. Studying science and math at William Howard Taft High School, he decided to become a chemical engineer. From 1944 to 1950 he studied at Purdue University to get his doctor of philosophy degree in chemical engineering.

In September, 1950, Bob went to Wilmington, Delaware, to help in the development of "Dacron" at Du Pont's Carothers Research Laboratory. (The laboratory is named to honor Dr. Wallace Carothers whose work led to the invention of nylon and "Dacron.")

Bob Forney's job was to help develop equipment to produce "Dacron." By 1952 this work had progressed so far that Du Pont was ready to have an experimental plant start producing "Dacron." The nylon plant at Seaford, Del., was chosen for this. Bob went to Seaford.

The Seaford plant produced only a limited quantity of "Dacron" during the experimental period, while Bob and his fellow workers perfected the machinery. At the same time, Du Pont was building its "Dacron" plant at Kinston. Bob was promoted to a higher job and went to the new plant. Now the plant is about ready to produce the new fiber.

MAN-MADE FIBERS

Bob Forney is big and broad-shouldered. He looks like a football star. He described how Dr. Carothers first developed his man-made fibers.

Wool, cotton, proteins, and many other materials are made of *polymers*. These polymers are made of groups of chemical elements hooked together in chains. Dr. Carothers and his co-workers discovered how to form these polymer chains. When they knew how to do this, they could take many different arrangements of chemicals and hook them together in long chains to form new kinds of polymers. They could then develop new fibers made out of chemicals.

Nylon was one of the first results of this discovery. Nylon is often said to be made of coal, water, and air. (Actually it's much more complicated than that.) Du Pont's "wizards of chemistry" developed the nylon process. Then they developed another process to make "Dacron" from products of petroleum. ("Dacron" is

(Continued on page 17)

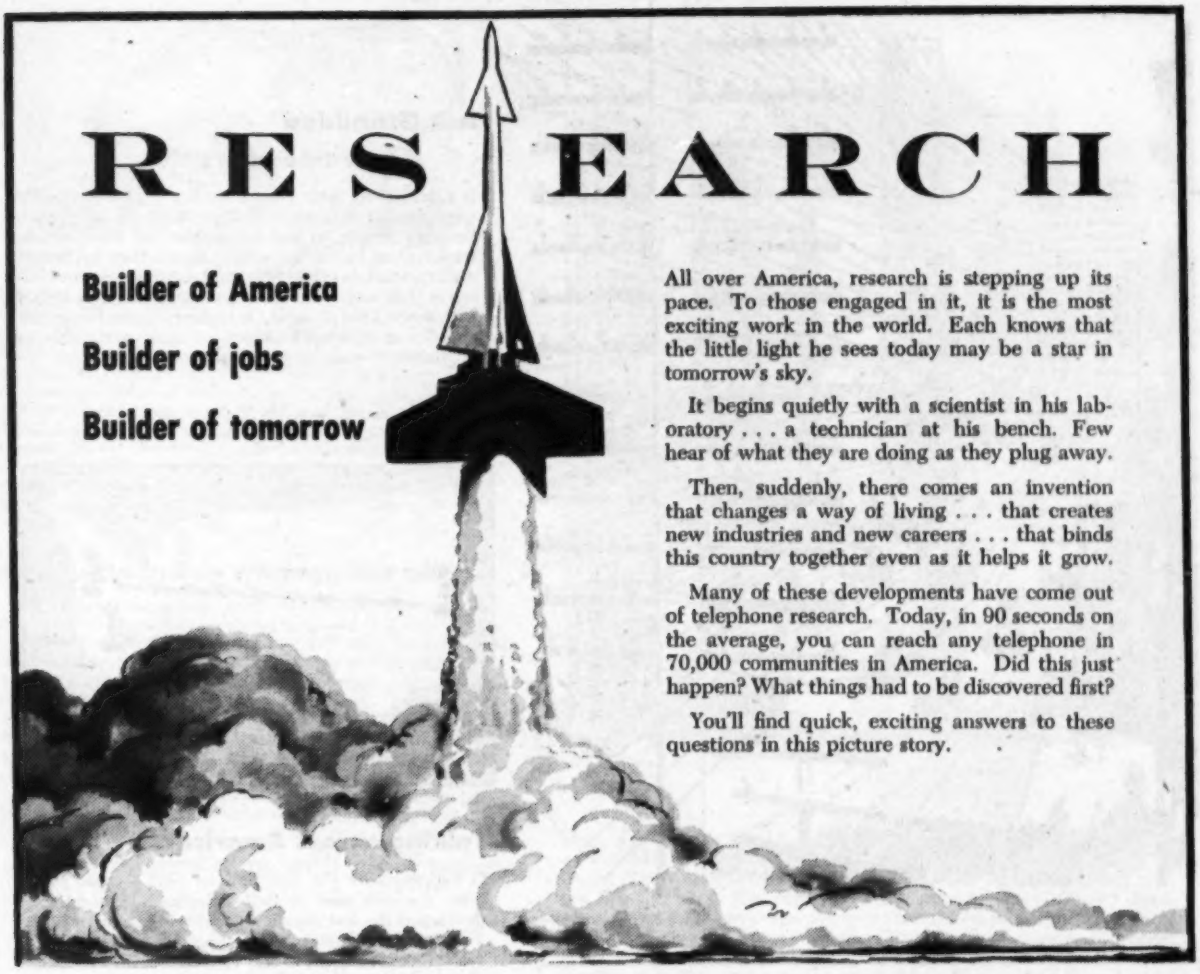
★ Means word is defined on page 24.

RESEARCH

Builder of America

Builder of jobs

Builder of tomorrow



All over America, research is stepping up its pace. To those engaged in it, it is the most exciting work in the world. Each knows that the little light he sees today may be a star in tomorrow's sky.

It begins quietly with a scientist in his laboratory . . . a technician at his bench. Few hear of what they are doing as they plug away.

Then, suddenly, there comes an invention that changes a way of living . . . that creates new industries and new careers . . . that binds this country together even as it helps it grow.

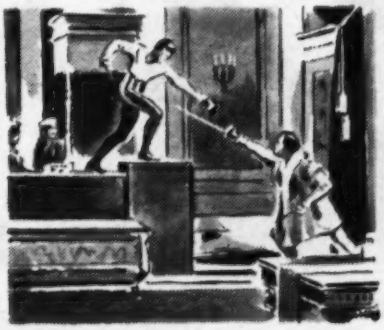
Many of these developments have come out of telephone research. Today, in 90 seconds on the average, you can reach any telephone in 70,000 communities in America. Did this just happen? What things had to be discovered first?

You'll find quick, exciting answers to these questions in this picture story.

Is this a rocket to the moon?

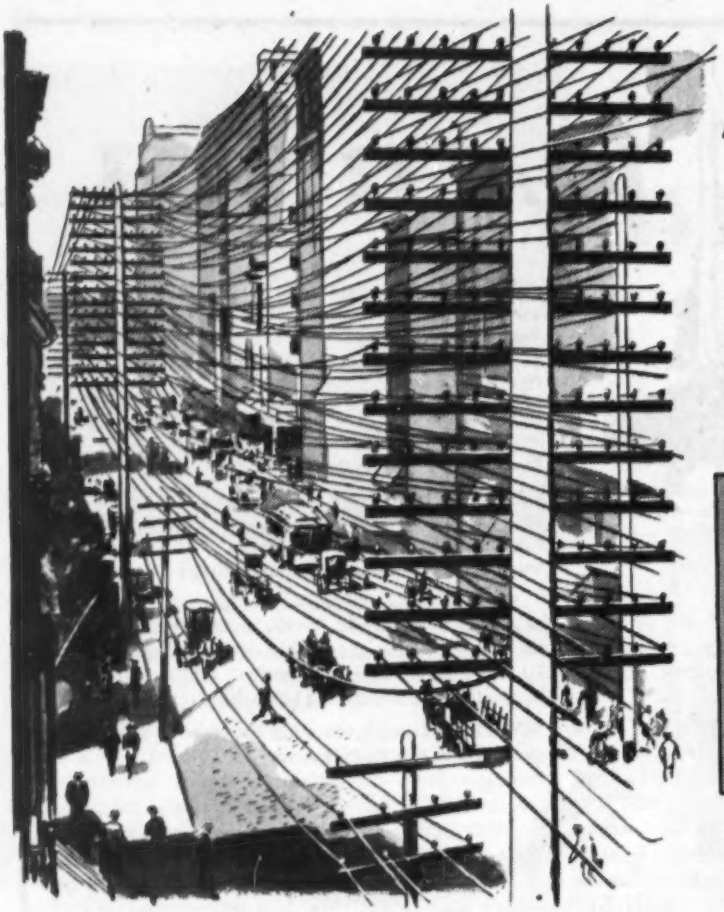
No – it's one of America's anti-aircraft guided missiles taking off. Launched, steered and exploded by electronic controls, the missile blasts into enemy aircraft at supersonic speed. This is one of the most dramatic products of American research. The electronic devices that launch and control the missile were produced by telephone scientists working with the Douglas Aircraft Company, which developed the missile itself. Bell Telephone men had been working with electronics for telephone purposes. When the country called on them in an emergency, they put their knowledge to defense use.

Is he talking by wire, air or pipe? The telephone company will speed his voice home to Mother by any or all of these channels, when he uses *today's* telephone. Long Distance calls may go part of the way by wire or cable . . . leap into the air over the new Radio-Relay microwave system . . . or use the small pipes in a coaxial cable. (Radio-Relay and coaxial are described on the following pages.)



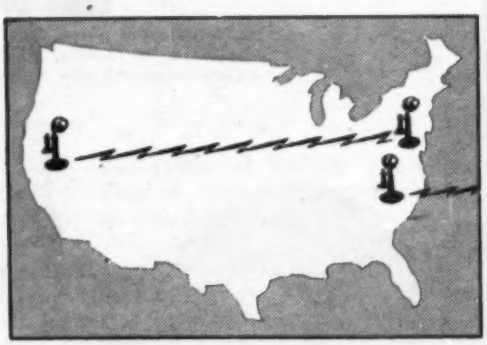
Did movies always talk? No, the old timers were silent. Then Bell System scientists developed the equipment that made sound movies practical. In the picture illustrated above—John Barrymore in *Don Juan* – music was first synchronized with action on film. That was in 1928. A year later came the first full-length movie with speech—Al Jolson in *The Jazz Singer*.

How does a television show reach your home? It travels over the telephone system part of the way. In fact, in a coast-to-coast network broadcast, both television and radio use special telephone lines 99% of the way from studio or stadium to you. The same research that led to modern telephone service provided channels for our great entertainment and information networks.



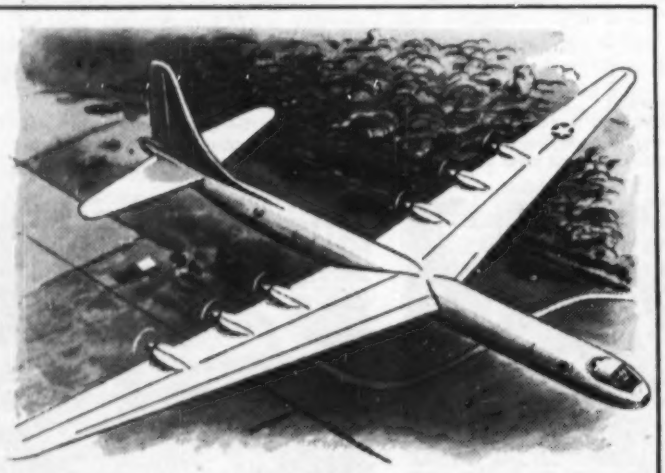
Ask Granddad if he remembers this

It's Broadway, New York City, in the 1880's—shortly after Alexander Graham Bell invented the telephone. So many people wanted telephones that there simply wasn't room for all the wires. Could they be buried underground, in cables? No, said some; voices couldn't travel that way. But Bell System research came up with a new kind of cable. It replaced many thousands of miles of overhead wires . . . made it possible to interconnect millions of telephones.



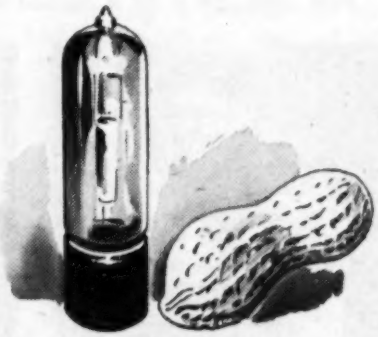
Talking across America

It happened for the first time in 1915 – three years after research men at Bell Telephone Laboratories developed the first practical amplifying vacuum tube. Tubes in "repeater stations" boosted voices as they sped from New York to San Francisco with the speed of light. Other tubes helped send conversations across the Atlantic for the first time, from Arlington, Va., to Paris. Thus, research linked Americans together—and with the world overseas.



Research pays off for the U.S.A.

Radar bombing systems for America's airplanes are important examples of the way research helps the country in emergency as well as in peace. The research branch of the telephone system alone is working on more than 100 defense assignments. They include atomic weapon developments and other top secret work. Bell scientists have already produced fire control equipment for anti-aircraft guns, improved radar, and a new field telephone for the Army.



"No bigger than a peanut"

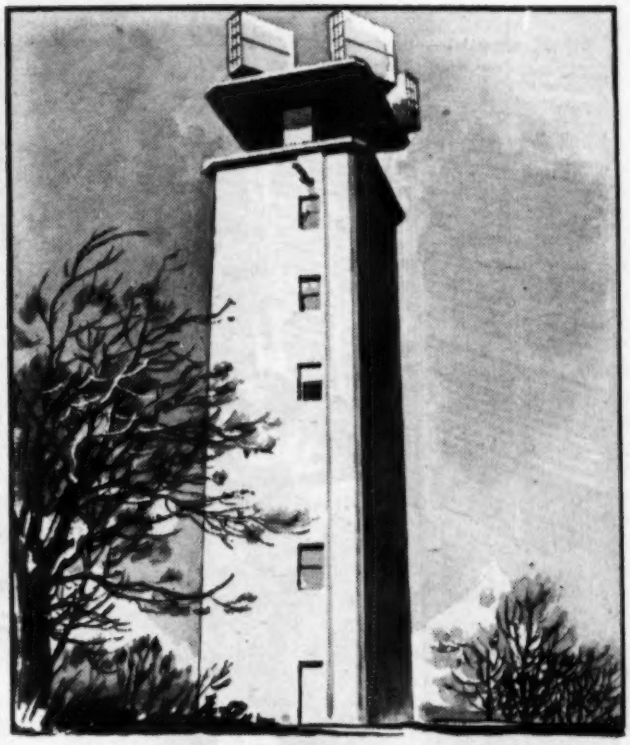
That's what they said when the vacuum tube shown above was produced. (Scientists still speak of it as the "peanut tube.") Because it saved space and drew less current, it could be much more widely used. One of the main jobs of research is often to make things smaller, handier and less expensive, as well as better.

1800 at a time

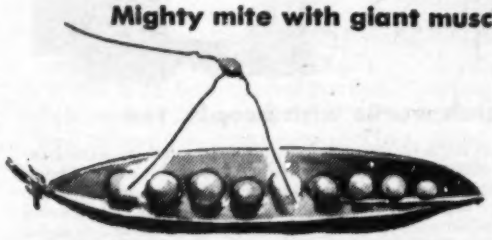
Once, only one conversation could travel over a pair of telephone wires. But more and more Americans wanted to talk. So "carrier telephony" came into being—using currents of different frequencies to carry several telephone messages on a single pair of wires. Then, in 1929, Bell scientists invented the famous coaxial cable, shown above. In coaxial, electrical voice vibrations travel through narrow pipes buried in the earth. Each coaxial pipe can carry as many as 1800 telephone voices at once—or 600 voices *plus* a good, clear television program.

A voice highway through the air

Coaxial gave the nation another communications link, but research men looked ahead and saw that still more channels would be needed. In 1947 they introduced Radio-Relay transmission of telephone voices and television. In Radio-Relay, metal lenses focus radio microwaves as a glass lens focuses light rays. Voices and network television ride the beams across the country. Because microwave beams won't bend and follow the earth's curve, Radio-Relay lenses must be mounted on towers or in stations high in the mountains. Then the messages are relayed from one to the other. It takes 107 stations to span America from the East to West Coasts.



Mighty mite with giant muscles



Here is one of the latest products of research in America. It is called a ***Transistor*** and was invented by the Bell Telephone Laboratories. No bigger than a pea, the ***Transistor*** can do many things a vacuum tube can do—and more. For example, it can amplify voices 100,000 times, using only a *millionth* of the power of the smallest tube. The ***Transistor*** has no glass, no vacuum, no filament. It consists of a wafer of a metal called *germanium*, connected to three hair-thin wires. ***Transistors*** may revolutionize the whole world of electronics—in television and radio sets . . . "electronic brain" computing machines . . . radar and secret defense equipment.

"Hello . . . I'm calling from the car!"

This mobile telephone, mounted right in an automobile, is one of many that have been produced by the Bell Telephone System for special uses. Other special installations let us talk from trains, airplanes, and ships far out at sea.

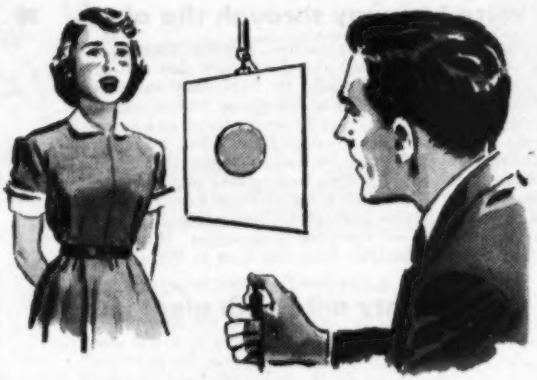
TURN PAGE
FOR MORE ABOUT RESEARCH

It almost thinks for you!

You've heard a lot about "electronic thinking machines." Here's one of them—an automatic telephone switching mechanism which goes to work when you dial a number. It takes the number you want, remembers it, finds the fastest way to get it, and even seeks an alternate route if one is busy—all in a matter of seconds.

What will tomorrow's telephone be like?

Here's just one indication. The fingers of that Long Distance operator are "dialing" a number—perhaps thousands of miles away. Some day every telephone subscriber may be able to reach any telephone in the country simply by dialing a number. Right now, 10,000 subscribers in Englewood, N. J., are making daily use of the first customer Long Distance dialing equipment. Still another future possibility is that you may some day just speak a number into the telephone and get the person you want automatically. And telephony is just *one* field where American research is working to make things easier and faster for all of us.



Research works with *people*, too

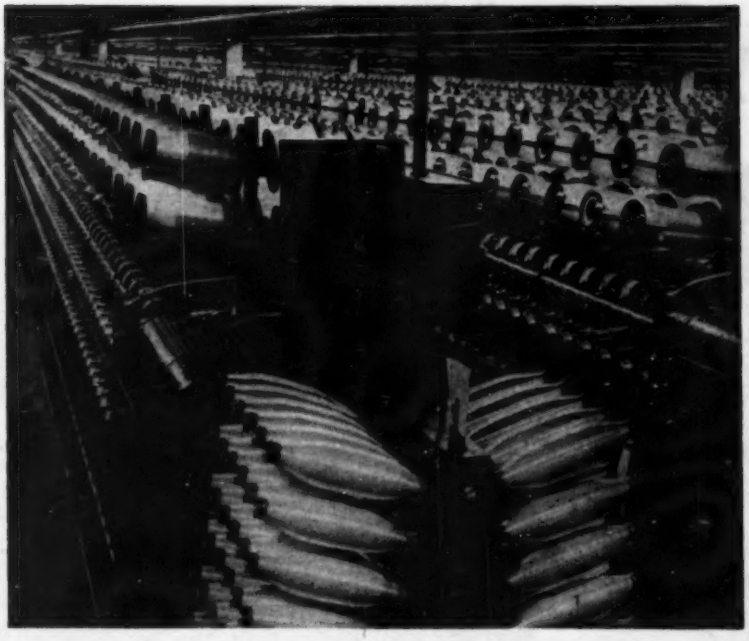
Most of us think of research as being connected with mechanical and chemical things. But today's scientists are interested in those things particularly as they relate to what *people* want. Then they set about to provide it. Here, a young girl's voice is being tested—one of a long series of studies designed to make the telephone still easier and pleasanter to use. Tomorrow's telephone will be built around things that people want. So will all the other advances science is getting ready for America even now.

What does this mean to *you* as you think of your future?

In the telephone business there are many different kinds of careers. Few businesses today offer such chances for varied and satisfying work in a public service, linking together the lives and activities of people, as the Bell System does. In each day's operations, telephone companies need men and women of various educational backgrounds and skills—craftsmen, operators, engineers, typists, clerks, scientists, sales and contact representatives, outdoor and indoor workers.

Each job opens the door to a fine future, with a high degree of job stability and security. There are many chances for promotion, in an interesting and constructive field that means much to our country. If you would be interested in finding out more about these opportunities, ask your school guidance counselor or inquire at your own telephone company office.

BELL TELEPHONE SYSTEM



This is the draw-twist area in Du Pont's Martinsville, Va., nylon plant.

Wizards of Chemistry

(Continued from page 12)

a much more wool-like fiber than nylon.)

"How do the liquid products from petroleum turn into threadlike filaments★ to make the fibers for cloth?" asked our reporter.

"The best way to explain that," Bob replied, "is to take you on a tour of our new plant here at Kinston. We'll begin on the top floor where production of 'Dacron' starts."

He led the way up flights of new metal stairs. On the top floor he paused in front of some large tanks which he called *polymerizers.*

"The petroleum-product liquids go in here," he said. "And they are polymerized. The liquids are combined into a molten★ polymer."

On the floor below, the liquid is forced through the small holes in an apparatus called a *spinneret.* The liquid hardens into long, white continuous fibers a little bigger than the fibers of spiderwebs. Then these fibers are run over fast-turning rollers to draw them out. Finally the "Dacron" fibers are packaged and sent to the mills which spin them into thread and cloth.

"The suit I'm wearing is made of 'Dacron,'" Bob said. "So is my shirt. A suit of one hundred per cent 'Dacron' like this costs from $78.50 to $92.50 right now. 'Dacron' combines well with other materials such as wool, cotton, and silk. You can buy a suit that's part 'Dacron' and part rayon for about $40. My shirt cost $10 and was well worth it. I just wash it out in a basin of water and hang it up. It needs no pressing. Think what I save on laundry bills! Women can get blouses and slips made from 'Dacron.' It's also made into coats and curtains.

"All 'Dacron' clothing is long-wearing. That's one reason why the Armed Services are interested in 'Dacron' clothing for both servicemen and women. Then 'Dacron' has industrial uses. It can be made into such things as sewing thread, belting for machines or fire hoses.

"There is a tremendous shortage of chemical engineers," Bob ended up. "Beginners receive good pay—about $350 a month. The chemical industry is growing rapidly. The need for chemical engineers is certain to grow for years to come."

Scholastic's reporter thought about what he'd seen as he flew home from Wilmington to New York. Looking down from the plane, he noticed the York River in Virginia. He thought of Yorktown and of George Washington fighting there. He thought of how the early American pioneers had pushed the U. S. farther and farther west. Washington pioneered as a land surveyor on the western frontier. Daniel Boone pushed west into Kentucky. Lewis and Clark went on to the Pacific Ocean.

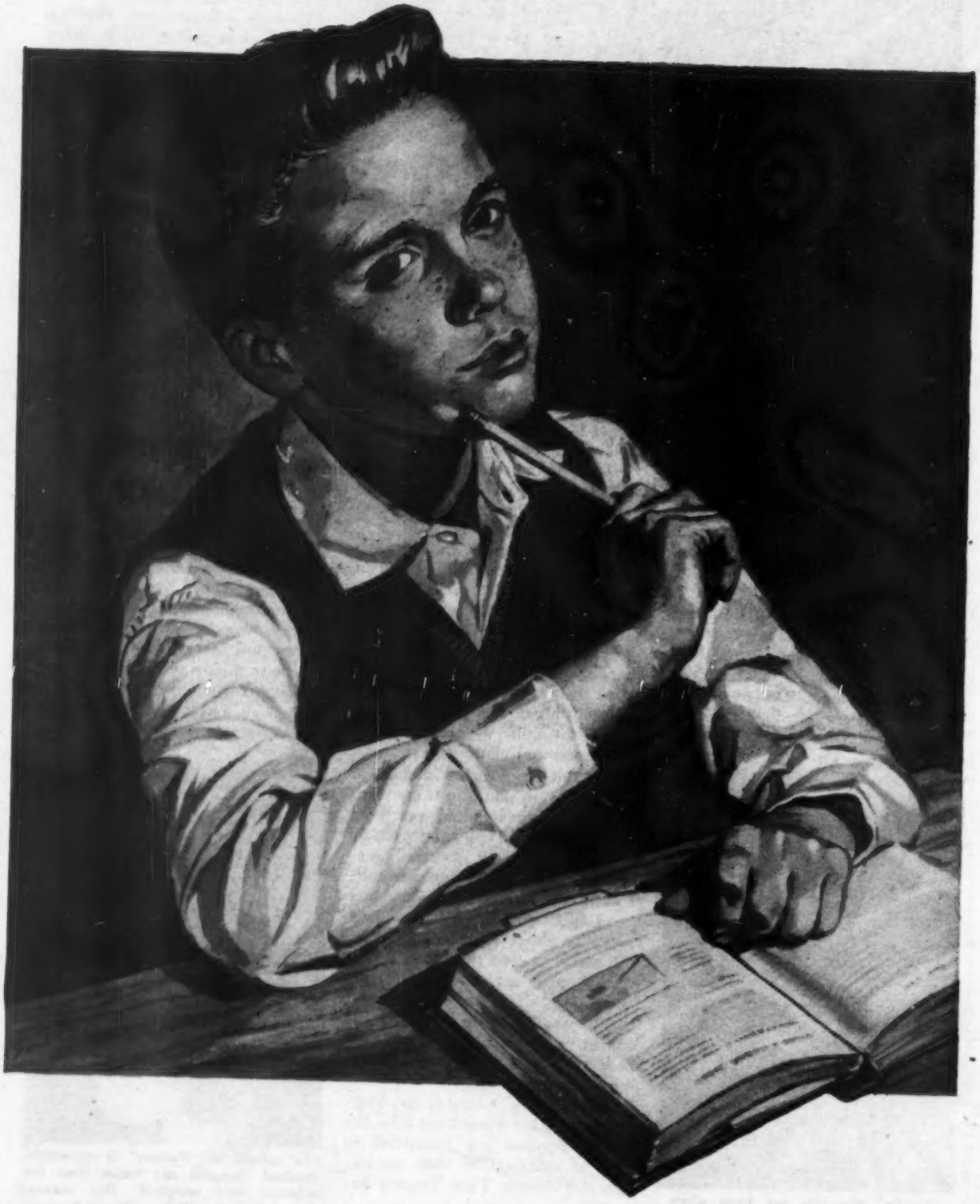
That was a long time ago. But the days of the pioneers are far from being over. Dr. Bob Forney and Dr. Peterson are our modern pioneers. They are pushing back the frontier of chemistry. In the last 50 years, men have made amazing progress in chemistry. They have discovered man-made fibers, atomic energy, plastics, wonder drugs, man-made rubber and many other inventions. But these discoveries may not seem so amazing when the next generation of chemists and engineers start their pioneering on chemistry's frontier.

"Dacron" filaments are born when the liquid is forced through spinneret.

The weight of "Dacron" is constantly checked. Samples are taken from the bobbins and weighed. This insures the uniformity of the "Dacron" yarn.

★ Means word is defined on page 24.

WANTED_



wide-awake day-dreamers

Where are these wide-awake day-dreamers, the Research Scientists of tomorrow? Right now they're in high school classrooms, preparing for their part in the Miracle of America.

Sinclair Research, in the endless search for new and better petroleum products, has an especial need for these young scientists when they are ready, offers them especially bright opportunities.

The famous Sinclair Plan is a typical example. Under this unique plan, Sinclair throws open its multi-million dollar research facilities to individual Americans, young or old, with worthy ideas for new or improved oil products or applications. The inventor must be protected at all times by a patent or patent application. Sinclair asks only the right to use the idea if the agreed work on the idea is completed and reported to the inventor. The inventor retains complete control and ownership.

Another example of Sinclair's continuing interest in the development of new scientists is the Sinclair Fellowship Program. Under this program, the Company sponsors promising graduate university students in such fields as chemistry, chemical engineering, geophysics, geology, petroleum engineering and catalysis.

At the present time, Sinclair Fellows are conducting these research projects at 13 colleges.

Why this heavy accent on youth?

Because Sinclair knows that Tomorrow's Scientist must come from Today's Youth—a youth who is dreaming today of a better tomorrow . . . *perhaps right in front of this page.*

SINCLAIR

A Great Name in Oil

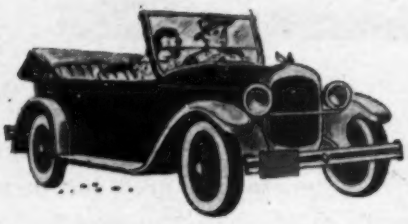
SINCLAIR OIL CORPORATION
600 FIFTH AVENUE, NEW YORK 20, N. Y.

GREAT MOMENTS

IN THE HISTORY OF CHRYSLER-BUILT CARS

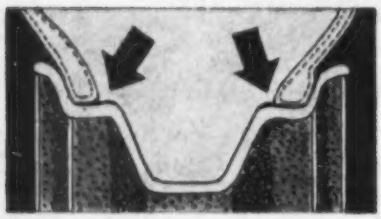
1923 ALL-STEEL BODIES

The first all-steel safety bodies for enclosed passenger cars heralded a radical departure in automobile body building. With the first all-steel bodies introduced by the Dodge Division, wood body parts including those previously used for structural reinforcement were eliminated altogether. Despite the skepticism of the rest of the industry, customers soon discovered that the new all-steel bodies were safer and stronger in every way, were finer in appearance and easier to maintain. The enthusiasm of the driving public for these significant advantages eventually forced the entire industry to follow.



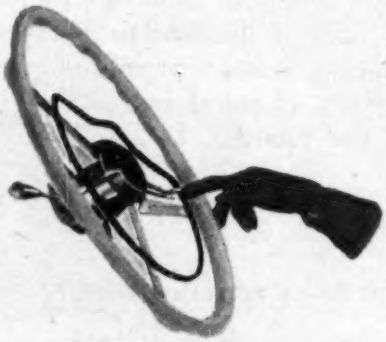
1924 FOUR-WHEEL HYDRAULIC BRAKES

Walter P. Chrysler and his engineers realized that stopping power had not kept pace with going power in the still young automobile industry. The introduction of four-wheel hydraulic brakes for passenger cars, like many other automotive developments of the time, was an engineering gamble. But it was a gamble that paid off to become one of the basic advancements in automobile progress. Customers quickly recognized the increased safety value of this remarkable means of bringing the car to a swift, sure stop. They wanted it, and four-wheel hydraulic brakes became universal on American automobiles.



1940 SAFETY-RIM WHEELS

Particularly noteworthy among the many advancements in driving safety introduced by Chrysler Corporation are Safety-Rim Wheels, which made their first appearance in 1940 and have equipped all Chrysler-built cars since. Developed for protection in case of a blowout, Safety-Rim Wheels have special retaining humps designed into the inner rims to hold a deflated tire and tube on the wheel until the car can be brought to a safer, straighter, controlled stop. Safety-Rim Wheels are just one of the long list of safety "firsts" by Chrysler, engineered for greater protection of the driver and passengers.



1951 POWER STEERING

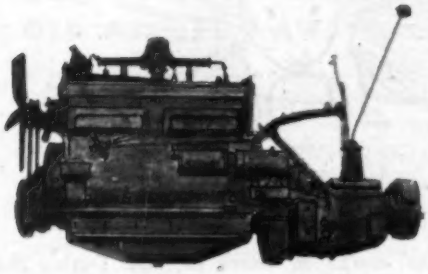
Power steering, offered first by Chrysler in 1951, established entirely new standards of automobile driving ease, comfort and safety. Engineered to perform 80 per cent of the steering work automatically, this revolutionary full-time power steering mechanism instantly supplies hydraulic power assistance during all driving and parking conditions whenever the steering wheel is turned. Full-time Chrysler Power Steering reduces driver fatigue during turning and parking, makes ordinary "straight ahead" driving easier and safer by resisting ruts and chuck holes, and provides quicker, surer control on wet or icy roads.

CHRYSLER

The story behind some of the famous "firsts" in automobile progress—

part of the long and growing list of advancements pioneered by Chrysler Corporation.

The first Chrysler "Six" of 1924 was a spontaneous sensation as a newcomer in an already crowded field. Willing to stake their future on a belief they could produce a better automobile, Walter Chrysler and his associates completely engineered the first Chrysler from start to finish. Over the years, Chrysler Corporation has steadily advanced its reputation for engineering good things first. Today, a staff of more than 3000 engineers is constantly adding to this growing parade of outstanding new developments in the automobile industry.

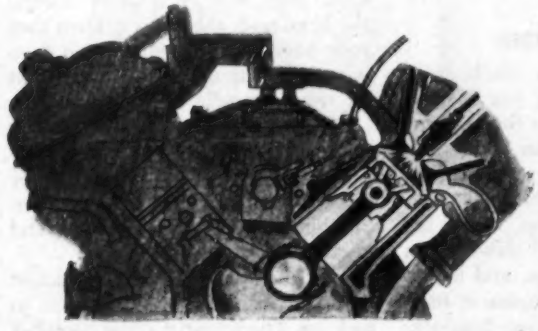


1928 HIGH COMPRESSION ENGINE

Chrysler engineers introduced the first modern high compression automobile engine in 1928 and called it the Chrysler "Red Head." From a standard compression ratio of only 4.6-to-1, the Red Head stepped up to 6.2-to-1, making possible more effective use of improved higher-octane gasolines, and producing greater engine efficiency and more economical performance than had ever been known. The 6.2-to-1 ratio pioneered by Chrysler Corporation in the Red Head was so far advanced in its day that it was not for ten years afterward that the rest of the industry was able to make it a standard.

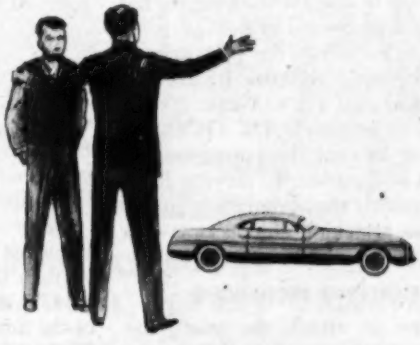
1931 FLOATING POWER ENGINE MOUNTINGS

Greater driving comfort, as well as increased safety and performance, was a constant aim of Chrysler engineers in the early days, just as it is today. Climaxing years of research, Chrysler was able to introduce in 1931 an advanced method of supporting the automobile engine in perfect balance on rubber mountings bonded to steel. Now vibration impulses originating in the engine could not be transmitted through the body of the car by metal-to-metal contact. This development, called "Floating Power," had far-reaching effect in reducing driving fatigue and increasing the comfortable ride of Chrysler Corporation cars.



1951 HEMISPHERICAL COMBUSTION CHAMBER ENGINES

Increased effectiveness of the modern automobile depends more on increased efficiency than on higher speeds. Toward this end, Chrysler engineers developed and perfected an advanced designed automobile engine with the famous Hemispherical Combustion Chamber. Formerly used only on aircraft engines and in a few racing and sport cars, this engine design was adapted by Chrysler engineers for the first time to quantity production for passenger cars. Designed to deliver far greater efficiency on either regular or premium fuel, the hemispherical head engine is probably the most spectacular of all the Chrysler engineering "firsts."

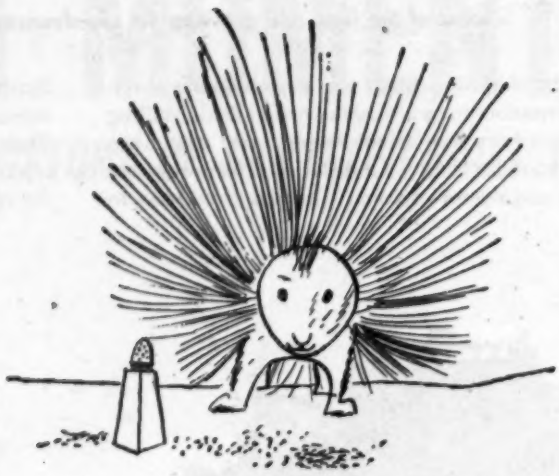


WHAT NEXT?

Chrysler engineering does not stop here, but works on in ever-expanding fields, improving the fine cars of today and searching for other remarkable developments. At Chrysler Corporation, the opportunity for fresh ideas and new talents never diminishes. There is a real challenge here . . . beckoning to young men and women with thorough educational backgrounds in mathematics and the sciences. Young people with imagination, daring and resourcefulness can find a richly rewarding career . . . working side by side with other engineers of Chrysler Corporation, helping to bring about the miracles of tomorrow.

CORPORATION PLYMOUTH • DODGE • DE SOTO • CHRYSLER

Bundle of Darts



"ONE day the whole world became very noisy," goes an Indian legend. "Birds chirped loudly, winds howled, animals roared. The noise annoyed our Great Spirit. He grew very angry. It was on that day, in his blind rage, that he created the porcupine and covered it with quills."

That's how U. S. Indians explain nature's "bundle of darts." The porcupine has a soft furry coat with 30,000 needle-sharp quills. They cover its body from head to tail. The quills, up to five inches long, lie flat and slant backward to the tail.

When left alone, the porcupine is an easy-going animal. It likes to sleep and eat a lot. When it's attacked or angry—LOOK OUT!

Under its coat the porcupine has a sheet of muscles. By moving them it can quickly straighten up its quills. Then an attacking animal runs into trouble.

FIGHTING TECHNIQUE

During an attack, the porcupine keeps turning around so that its tail is in the enemy's face. Soon the enemy loses its patience. It lunges at the porcupine. With lightning speed, the porcupine jerks up its powerful club-like tail.

The tail drives hundreds of quills into the enemy's jaw and throat. Then the porcupine lowers its head and charges. It drives still more quills into the enemy's body.

The quills come loose easily. They are not poisonous. But they stick to the enemy and work their way into its body. If the quills get stuck in its mouth and throat, an animal can't chew or swallow food. Mountain lions, bears, panthers, wolves, and other animals have starved to death after battling porcupines.

Nature gave the porcupine its quills for good reason. The porcupine, a rodent, is slow-moving and clumsy. It has a plump roly-poly body. It waddles along on its short bow legs, thumping and dragging its stubby tail. A full-grown porcupine, from the tip of its tail to its nose, is about three feet long. It weighs from 20 to 30 pounds.

A TREE CLIMBER

A porcupine spends much of its time climbing trees. It has flat feet with long curved claws for gripping branches. As it climbs a tree, it gnaws on the bark. Its strong yellow teeth are shaped like chisels.

Often the porcupine rakes the branches with its sharp claws. Then it stuffs the bark, twigs, and leaves into its mouth. A porcupine is fond of the inner bark of spruce, hemlock, birch, or poplar trees. It also eats grass, plants, and berries but hardly ever touches meat.

For sweets, a porcupine taps maple bark when the sap is running. It sits under the tree and lets the sap drip into its mouth. And its favorite dish is salt.

This craving for salt sometimes gets the porcupine in trouble with man. It eats anything salty from the sweat of man's hand. The porcupine gnaws on tool handles, ladders, oars, and so on.

Porcupines roam around at night in search of food. During the day they sleep in hollow logs or in caves. Some porcupines curl up behind large rocks for a snooze.

A U. S. scientist says porcupines make good pets. He and his wife have trained several of them. The porcupines are as friendly and active as pups, the scientist reports.

FUN AND GAMES

"You can have fun if you raise a few porcupines together," he says. "Ours like to wrestle in our yard. First they hold each other around the head with their paws. Then they rock back and forth until one tumbles. When it stands up, they start all over again."

Most of the time, when they're not eating or sleeping, the porcupines dash around the yard. They chase after a ball or after each other. Suddenly they stop, spin around, and go after their tails.

The porcupines like to be picked up and stroked. They're not hard to pick up. The scientist slides his hand under the porcupine's belly and lifts it slowly. Then he strokes the quills back from head to tail. Should he stroke "against the grain" the porcupine's quills would straighten up and stick him.

"Our porcupines never stay angry long," says the scientist. "We feed them handfuls of salt from time to time. Then we're the best of friends again."

But *you'd* probably be wiser to keep a bird or cat or dog as a pet. A porcupine, even a friendly one, is still a bundle of darts.

HAVE YOU HEARD?

DON'T THROW YOUR FUZZY OLD RECORDS AWAY!

Those scratchy records, too bad to play, too hot to toss out, can be made to sound "young" again. You disc fans will be happy to know General Electric engineers have come up with a new Record Compensator that helps cut the surface noise from old 78 rpm shellac records. The device has a five-position variable control for "hi-fi" tones.

TWO PICTURES ON ONE TV SCREEN

TV viewer's dream comes true: how to follow the action in two places at one time. New G-E portable pickup system does jobs formerly almost impossible except in the studio. Look for electronically controlled split pictures on your set this season!

SOUNDLESS SOUND LAUNDERS GREASY OBJECTS

Soaking greasy parts in liquid solvent to de-gunk them is done in lots of factories, but G-E engineers hit on an improvement. Sound waves—too high to hear—now speed the job of the solvent. Laboratory engineering in the field of *ultrasonics* is making new gains for industry.

You can put your confidence in—

GENERAL ELECTRIC

WORDS TO THE WISE

WHAT'S IN A WORD?

influence. *Influence* is the power to affect someone or something. We say that a person who has "pull" or authority has *influence*. Some people *influence* (help to form) certain events.

The word *influence* is made up of two Latin words: *in* (in) and *fluere* (to flow). Here is the story of how the word got its present meaning:

People once thought the stars had magic powers. They believed that a mysterious liquid "flowed in" to earth from the stars. This "star liquid," they thought, shaped (influenced) people's characters.

It was even thought that the power of the stars influenced people's health. If a person got sick, some star was responsible.

Our word *influenza* (or *flu*) dates back to this old belief. The Italian word for *influence* was *influenza*. Nowadays we know that influenza is caused by a virus (small body, too tiny to see, that carries disease). But when the ancient Italians took to bed with the fever and muscle pains that are caused by influenza, they thought the stars were to blame. That's why they called the disease *influenza*—the "influence" of the stars.

The belief that the stars influence our personalities and health is called *astrology* (uh-STRAWL-uh-jih). The word means "the science of the stars." Today science has proved that there is little truth in *astrology*. The real, scientific "science of the stars" is called *astronomy*.

Here's How

Do you have a piece of scrap paper? Write on it in big letters the word *influence*. Now number each letter of influence in order (*i*, 1; *n*, 2; *f*, 3; etc.).

Using the right letter for each number, write out the words that you get from the following number combinations.

4586 _____ 352764 _____

8456 _____ 3594 _____

Now use each of these four words in the space where it belongs in each of the following sentences:

1. Gasoline is used as a _____.

2. The detective had no _____ as to who the criminal might be.

3. Mrs. _____ is our new Ambassador to Italy.

4. George poured the milk into the bottle through a _____.

Can you find any other English words besides these four in *influence?* See how many you can find. Then write out the words you've found in numbers, as we did with our four words. Change papers with your classmates and see who can "decode" the other's words the fastest.

STARRED ★ WORDS

Words starred ★ in this issue are defined here.

balsa (BAWL-suh). Noun used as adjective. A very lightweight wood.

chasm (KAZ'm. Pronounce *a* as in *fat*). Noun. A deep crack in the surface of the earth, a gorge.

craving (KRAYV-ihng). Noun. A strong desire, a yearning.

fiber (FYE-ber). Noun. Substance that is drawn out like a thread.

filament (FIHL-uh-mehnt). Noun. A very slender thread or fiber.

fungi (FUHN-jye). Noun, plural of *fungus*. Plant growths such as molds and mildews, with no leaves or flowers.

llama (LAH-muh). Noun. South American animal that looks like a small camel, without a hump; used as a horse, and for wool, meat, and milk.

molten (MOHL-t'n). Adjective. Melted by heat.

obstacle (OB-stih-k'l; *o* as in *hot*). Noun. Something that stands in the way of something else.

relay (REE-lay). Noun. A group of people taking turns; each, after a certain length of time, is relieved by someone else.

HOW TO PRONOUNCE

polyester (POL-ih-EHSS-ter; *o* as in *hot*).

Junior Writers

Sea Steed

Proud steed of the sea,
Pawing and smashing the salty blue
With your gigantic forefoot,
Steaming and snorting,
Back from the lonely, blue trail
And the snowy albatross,
Free from the screaming winds
And leviathan waves,
Back to the skee and skirl of gulls,
And white ships at long-legged wharves.
Proud steed of the sea,
Corralled behind a finger jetty.

David B. Butler, Grade 9
Robert Fitch H. S., Poquonnock Bridge, Conn.
Teacher, Catherine Devine

The Waterfront

A whistle blows,
A steamer docks—
A tramp steamer
With hull covered with rust.
The captain steps from the wheelhouse.
An order is shouted,
A windlass screams,
And a hawser coils out.
Warehouses, gray and worn,
Holding strange things from faraway ports:
Cocoa from South America,
Silk from China,
From Singapore, spices lending fragrance to the crisp, cool air.
Many steamers line the wharves; from liners, slim and fast,
To rusty tramp steamers, vagabonds of the Seven Seas.
What mysterious, dark secrets fill their holds?

Robert Schwartz, Grade 7
James Madison Jr. H. S., Seattle, Wash.
Teacher, Mabel Lillesve

The Pepper Johnny Picked

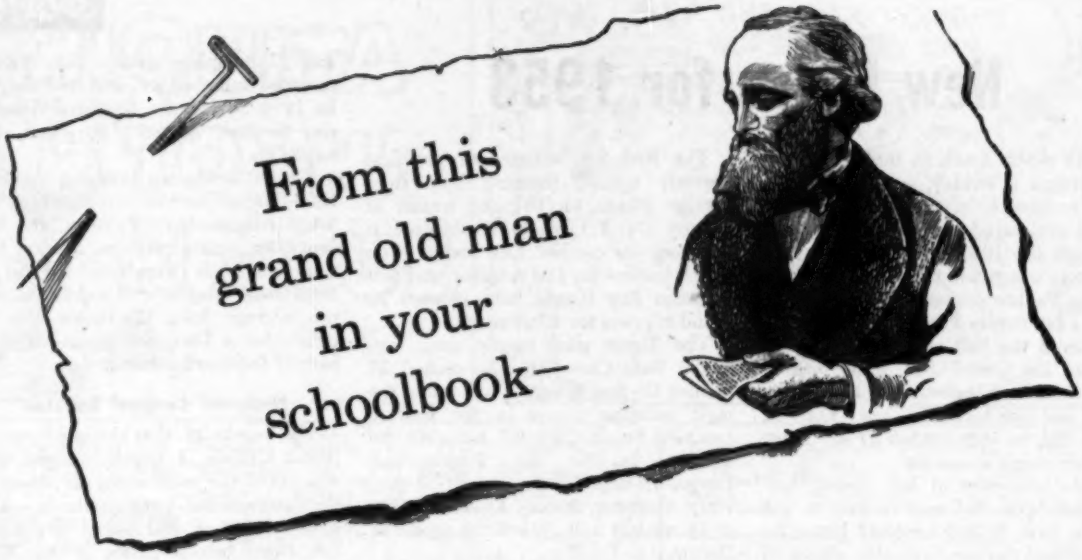
Johnny picked a pepper for Patty Peterson.
Patty ate the pepper and burned her little tongue.
Patty's mother came a-running, and Patty sadly said:
"I burned my little tongue because
I didn't use my head."

Claudia Zarkia, Grade 5
Roosevelt School, Spokane, Wash.
Teacher, Mrs. Genevieve Cromwell

A Sad Story

There was a young man named Paul
Who went to a fancy dress ball.
He thought he would risk it
And go as a biscuit,
But a dog ate him up in the hall!

Sally Ann Hinsch, Grade 6
Creswell School, Shreveport, La.
Teacher, Mrs. Goodson



came this brand-new idea to make better car bearings

EVER wonder what the point is in learning the theories of such old-timers as the early physicists, Michael Faraday, Joseph Henry and James Clark Maxwell?

Well, our General Motors engineers could give you a very quick and serious answer. Particularly, right now, about James Maxwell in the case of engine bearings.

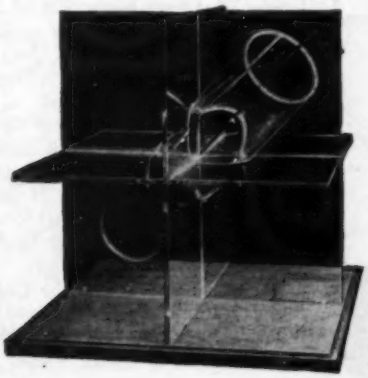
* * *

A BEARING, as you probably know, is a metal "cushion" which protects a moving part of an engine, such as the crankshaft, from excess wear. In recent years, as engines have become more and more powerful, the need to build engine bearings able to take over tougher punishment without splitting or cracking has increased by leaps and bounds.

Nearly a hundred years ago James Clark Maxwell set forth what is known as the Maxwell Theory of what happens to the energy absorbed by a piece of metal under terrific strain. And in their long and intensive research to improve bearings—marked by many major advances in bearing design and materials—GM engineers have recently found new clues to reducing bearing fatigue in this old schoolbook law.

By building the three dimensional plastic model (shown below) illustrating the application of Maxwell's Theory, they have come to conclusions which will help them design and build even longer-wearing bearings for cars, trucks, planes and tanks.

So don't ever take the old-timers in your books lightly. They may very well be helping unlock a problem right now for American industry. Just as they may very well help unlock a future for you as a much-needed scientist or engineer with such an industrial leader as General Motors.



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BODY BY FISHER · FRIGIDAIRE · GMC TRUCK & COACH
GM DIESEL · UNITED MOTORS SERVICE · AC SPARK PLUGS

Hear HENRY J. TAYLOR, on the air every Monday evening, over the ABC Network, coast to coast.

New Faces for 1953

WAY down South in the land of oranges (Florida), an army of baseball rookies is getting the once-over from eagle-eyed managers. Let's sift through the 1953 rookie crop and try to figure which will make the grade.

The Yankee dreamboat is Bill Skowron, a brawny ex-Purdue grid star who murdered the ball at Kansas City last season. He batted .341 while leading the American Association in homers (31) and runs batted in (134). Only 22 years old, he may be left at K. C. for another year's seasoning.

Bill's teammate of last season, first baseman Don Bollweg, is sure to get a close look. A .325 long-ball hitter, he was picked the most valuable player in the league.

Cleveland is high on pitcher Dave Hoskins, a right-hander who won 22 games for Dallas and had a remarkable 2.12 earned-run average. Prize hitting hope is outfielder Dave Pope, up from Indianapolis with a .352 mark that won the American Association batting title. Another outfielder, Mike Lutz, copped the Eastern League batting title with a .321 mark.

The Red Sox will try to get desperately needed pitching help from George Uhaze, an 18-game winner at Albany (N. Y.), while Washington is counting on catcher Les Peden, who hit 18 homers for Los Angeles, and first baseman Roy Hawes, who clouted 20 round-trippers for Chattanooga.

The Tigers gaze fondly upon outfielder Rufe Crawford who socked 27 homers for Scranton and was voted the most valuable player in the Eastern League. Frank Carswell hit .344 for Buffalo, leading the International League in both batting and home runs (30). Shortstop Harvey Kuenn hit .340 at Davenport and .325 in 19 games at Detroit.

The big hope of the Browns is Bill Hunter, the Fort Worth shortstop for whom the club forked over $90,000 and three players. A .284 hitter, Bill is a terrific fielder. Other hopes are catcher Buck Baich, who banged .335 for Oklahoma City, and pitcher Bobo Holloman, a 16-game winner at Syracuse.

The White Sox only have eyes for pitcher Bob Keegan, who topped the International League with 20 victories and 27 complete games. Bill Wilson, returned from service, is a real sleeper. In 1950 he led the Southern Association in runs, homers (36), and runs batted in.

The Athletics are bringing up Tom Hamilton, whose .343 average won the South Atlantic batting crown, and two promising young pitchers. Marion Fricano won 17 at Ottawa and led the International League with a 2.26 earned-run average. John Mackinson won 16 games for a last-place team—Birmingham of the Southern loop.

National League Rookies

The apple of the Dodgers' eye is Junior Gilliam, a streak of light who was voted the most valuable player in the International League. He hit .301, scored 111 runs, and batted in 112 tallies. Right behind Junior is Don Zimmer, a flashy shortstop who hit .310 with 17 homers and 91 runs batted in at Mobile.

One of the aces in the Card deck is Jim Beavers, jumping into the majors all the way from Class D ball (Hazlehurst in the Georgia State loop) where he batted .363 with 21 homers.

The Giants appear to have picked three plums in Daryl Spencer, the American Association all-star shortstop who hit .294 and slammed 27 homers; third baseman Rance Pless, who led the Southern Association with a fat .364; and catcher Ray Katt, a great defensive backstop who hit .304 at Minneapolis.

The Braves offer the sensational Jim Pendleton, International League all-star shortstop, plus: Jim Mainzer, a .326 hitting all-star shortstop from Wichita Falls; pitcher Don Liddle, who won 17 and lost only 4 with a 2.70 earned-run average at Milwaukee; and Chuck Tanner, who belted .345 at Atlanta.

Chief Red hopes are second baseman Johnny Temple who hit .306 for Tulsa; catcher Hobie Landrith, who batted .300 at Tulsa; and pitcher Barney Martin, who posted a 23-7 record at Columbia.

The Phillies are banking on Bob Greenwood, Western International league all-star pitcher with a 16-10 record including 23 complete games and an earned-run average of 2.45. Two other good young pitchers are Ron Mrozinski and John Sanford.

If the Pirates go anywhere this year, they'll get there because of outfielders Carlos Bernier, speed demon who hit .301 and stole 65 bases for Hollywood, and Frank Thomas, who hit .303, blasted 35 homers, and drove in 131 runs at New Orleans.

The pride and joy of the Cubs are young pitchers Fred Baczewski, Jim Willis, Vern Fear, and Cal Howe.

—HERMAN L. MASIN, *Sports Editor*

TO YOUR GOOD HEALTH

Fish gives you the same proteins for healthy growth that meat does. Eat it often. Since fish doesn't "stick to the ribs" like meat, top off a fish meal with pudding, pie, or custard dessert.

CHIQUITA TO THE RESCUE
THIS WALK HOME IS WORSE EVERY DAY. I'M BEAT.
BOY, SO'M I. BY 3:00 I FEEL LIKE I'VE BEEN DIGGING A DITCH WITH A TEASPOON.
MY MARKS ARE SCRAPING BOTTOM.
FLUNK
YOU SHOULDA HEARD THE COACH BLOW UP TODAY. I REALLY THOUGHT I WAS FINISHED.
THINGS ARE LOOKING WAY DOWN. WHATTA WE DO NOW?
IT'S SIMPLE. TAKE A TIP FROM ME. HERE, DIG IN FOR SOME QUICK ENERGY.
WOW! CHIQUITA, YOUR BANANAS ARE POWER-PACKED. C'MON, BILL, I'LL RACE YOU HOME.
Teeners love fully ripe, energy-packed bananas! For a FREE copy of my banana song fill out and mail the coupon below.
United Fruit Company, Dept. SM
Pier 3, North River, New York 6, N. Y.
Please send me FREE Chiquita Banana's song.
NAME
ADDRESS
CITY
STATE

VOLUME 32 NUMBER 7 MARCH 18, 1953

Citizenship Quiz

RATE YOURSELF: 90-100—Good work! 80-89—Better than average; 70-79—Fair; Below 70—How about more work?

1. QUILL QUIZ

Cross out the incorrect words inside the parentheses so that each statement will be correct. Score 4 points each. Total, 24.

1. The soft, furry coat of the porcupine contains (15, 30,000, 5,000,000) quills.

2. The quills (are all in the tail, cover its body from head to tail, are just around its mouth).

3. When it is being attacked, the porcupine keeps turning so that (its tail is in the enemy's face, the enemy becomes dizzy, the enemy becomes confused).

4. The porcupine uses its tail to (drive quills into its enemy, fan itself, leap like a kangaroo).

5. The porcupine spends most of its time (climbing trees, swimming, picking fights).

6. A porcupine's favorite dish is (meat, twigs, salt).

My score_____

2. A CLASS IN GLASS

Put T in front of the statements which are true. Put F in front of the false ones. Score 5 points each. Total, 40.

__1. Diving boards can be made of glass.

__2. The first project scientists helped Corning Glass with was making frozen foods.

__3. Glass was first made about 7,000 years ago.

__4. Glass can be used to make life jackets float.

__5. Scientists have still found no kind of glass which can be used by housewives for cooking.

__6. Railroads are one industry which has benefited greatly from industrial research in glass.

__7. The Corning Glass Works has only about 25 "recipes" for glass.

__8. Corning, like most big companies, has a program for training young people.

My score_____

3. RESEARCHING INDUSTRY

Check the correct ending to each of the following statements. Score 4 points each. Total, 16.

1. Forty years ago the number of scientists and engineers in the U. S. (compared with today) was
   a. smaller. b. bigger.
   c. about the same.

2. In recent years we've started to get clothing from
   a. flax. b. seals.
   c. the scientist's test tube.

3. Before making nylon, scientists had to discover how to form
   a. polymer chains. b. "Dacron."
   c. unbreakable glass.

4. Modern pioneers are every day pushing back the frontiers of
   a. arithmetic. b. chemistry.
   c. the American West.

My score_____

4. UNSCRAMBLING THE NEWS

Unscramble the key word in each sentence and write it on the line provided. Score 4 points each. Total, 20.

1. The country marked A on the map is called ERUP.

_____

2. The country marked B is called DEAROCU.

_____

3. Those two countries are in the news because of a huge road system built many years ago by the SCANI.

_____

4. A tunnel linking Africa and Europe may be built under the Strait of BRATGLAIR.

_____

5. Women recently received the right to vote in COIMEX.

_____

My score_____

Total score_____

SHUTTERBUG JUNIOR SCHOLASTIC

Send the best snapshots you have taken to Shutterbug Editor, Junior Scholastic, 351 Fourth Avenue, New York 10, N. Y. If your picture is good, you will receive a Shutterbug button.

FREE RIDE. Guamanian boy and his friend on water buffalo. Taken on Guam by Iris Phillips, Monitor (Wash.) School.

ALL TANGLED. By Philip Kligman of Beeber Jr. H.S., Philadelphia, Penna.

MUSIC AND ART. By Bobby Kattenburg, Barrett School, Belmont, Cal. Photo shows portrait of Bobby, his cello, his father's violin, and his mother's piano.

NEW MOVIES

✓✓✓✓Tops, don't miss. ✓✓✓Good. ✓✓Fair. ✓Save your money.

✓✓✓THE TALL TEXAN (Lippert). This is a tense, exciting, and somewhat different Western. Out on the New Mexican desert a stage coach is attacked by savage Indians. From one of the Indians the travelers learn of a nearby gold field, and immediately change all their plans. Instead of returning escaped convict Lloyd Bridges to prison in El Paso, Sheriff Samuel Herrick persuades the entire group to join him in panning for the precious metal.

Immediately, the lust for gold inflames them all. As each works his own claim, the group becomes increasingly distrustful of one another, jealous of one another's gains. When two of their number break the rules and cross over into forbidden native burial grounds to seek richer deposits, the Indians finally attack and all but wipe out the greedy little band. Marie Windsor, Lee J. Cobb and Luther Adler head the supporting cast, but probably the strongest support comes from the rugged, sun-baked, handsome country.

✓✓✓I LOVE MELVIN (MGM). Here is as pleasant a Technicolored musical as you are ever likely to come across. Donald O'Connor, a young bulb carrier on LOOK, wants to get his girl's picture on the magazine cover. Although the girl is Debbie Reynolds, the task proves far from easy. Donald doesn't worry about it too much, however. He frequently takes time out for a catchy song or a clever dance with Debbie—even an acrobatic number on roller skates with Debbie's little sister, Noreen Corcoran. Young O'Connor is terrific in this picture. He can sing, dance and clown with the best of them. And tiny Debbie Reynolds makes a perfect partner for him. The whole thing is done with high good humor.

✓✓THE MAGNETIC MONSTER (United Artists). The monster in this film is the atom, transformed by experiment from an element that throws off energy into a new form that gathers in energy. It lives on electricity. If not regularly fed its quota of voltage, it explodes and sucks in everything around it. And every 11 hours it doubles in size. The job of tracking down this electronic monster falls to Richard Carlson of the Office of Scientific Investigation. The picture shows how he goes about this ticklish business, armed with Geiger counters and all the other gadgets for tracing radioactivity. Finally the monster element is captured and imprisoned in a giant deltatron miles below the sea. The director has made the story startlingly real. Too bad his cast couldn't have been as convincing.

Faster! FASTER PICK-UP—easy-to-pedal U. S. Royals mean quicker getaways—and you stay out in front!

Farther! FARTHER COASTING—U. S. Royals do new things for your bike—and they last longer, too!

Safer! SAFER STOPS—safer turns—U. S. Royals give your bike that "sure-footed" feel.

America's finest bicycle tires

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Six Colored Ecuador, First U. S. Commemorative, Devils Island, Others, Free with approvals.

CAPITAL STAMP COMPANY, Little Rock 7, Ark.

Canada's Wildlife Set

On April 1 Canada will issue three animal stamps for its national wildlife week, April 5-11. Canada has started a drive to stir up interest in the importance of protecting wildlife resources. Government officials report that Canada's wildlife is "being depleted at an alarming rate."

The three stamps show commonly known wild animals of Canada. The 2¢ blue pictures a polar bear, the 3¢ brown a moose, the 4¢ black a bighorn sheep. Stamps showing other wild animals will be issued every year in the future.

Canada recently issued an Indian totem pole stamp in black. The $1 stamp shows a totem pole and a Pacific Coast Indian house against a background of mountains. Totem poles were used by many North American Indians to record their tribes' history and customs. With great skill the Indians carved animals and gods on the poles.

STAMPING GROUNDS: On April 24 the United Nations will issue its first new stamp for 1953. It will be a "refugee" stamp—to serve as a reminder that many persons today are homeless and in great need. During the rest of 1953 the U. N. also will issue stamps paying tribute to United Nations Day, Human Rights Day, the Universal Postal Union, and a U. N. specialized agency.

Next week Japan will issue a stamp commemorating the 75th year since the first electric lights were used there. The stamp shows an old-fashioned arc lamp, the kind used before Edison invented the incandescent lamp in 1879.

The polar bear stamp

Courtesy of Canadian Information Service

The sheep and moose stamps

Pop's Pen

Bob: "Johnny, who is your favorite author?"

Johnny: "My father."

Bob: "What does he write?"

Johnny: "Checks."

Nancy Roth, Horton Watkins H. S., Ladue, Mo.

Sad Plight

Frank: "How did Jonah feel when he was swallowed by the whale?"

Ted: "Down in the mouth."

Howard Tirschwell, Yeshivah of Flatbush, Brooklyn, N. Y.

Clear as Could Be

Nell: "Since your boy friend got home from Korea, why do you call him 'Cookie'?"

Lucy: "Because he has been a wafer so long."

Troy Mason, Laton, Calif.

A Usual Thing

He was trying hard, but he didn't seem to be saying the right things to the pretty girl.

"That lovely smile," he crooned, "and your beautiful eyes. Where did you get those eyes?"

"Oh," she replied coolly, "they came with the head."

Jill Underwood, Alex W. Spence Jr. H.S., Dallas, Tex.

More Troublesome

Irv: "What is worse than a giraffe with a sore throat?"

Jack: "A centipede with corns."

Doug Jacques, Palo Alto (Calif.) Military Academy

Tight Squeeze

Connie: "Who was the smallest man in history?"

Frank: "The sailor who went to sleep on his watch, of course."

Margaret Hyde, 11232 Occ. South, Seattle, Wash.

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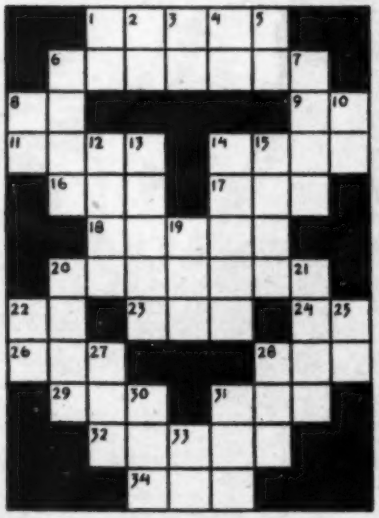
quiz-word PUZZLE



This bird is called a "soldier bird" because its shoulder colors look like uniform epaulets. It is a member of the blackbird family. Its name and habits are in this puzzle.

There are 42 words in the puzzle. Score two points for each you get right. Perfect score, 84.

ACROSS

1. Favorite living place of mystery bird is a boggy area called a – – – – –.
6. Coming from the west.
8. Exist.
9. Electrical Engineer (*abbrev.*).
11. A young cow.
14. Highest point of something. (Rhymes with *annex.*)
16. – – – de Janeiro.
17. Married. 18. Not dirty.
20. Mystery bird.
22. Second note of the musical scale.
23. Place in position.
24. Within.
26. Color of mystery bird's shoulder patch.
28. Everyone.
29. Something owed. (Rhymes with *blue.*)
31. Painting or drawing.
32. Main color of mystery bird.
34. Small rug.

DOWN

1. Myself. 2. Like.
3. Right (*abbrev.*).
4. Southeast (*abbrev.*).
5. Hour (*abbrev.*).
6. What you do to clothes.
7. Require.
8. Before Christ (in a date).
10. Prefix meaning "formerly" as in – –president.
12. Plural of *louse.*
13. Bends over, as of paper.
14. Wait for.
15. Founder of Pennsylvania.
19. Female sheep.
20. The stalk of tall grass, particularly in marshy land.
21. Gold covering on a surface. (Rhymes with *built.*)
22. Railroad (*abbrev.*).
25. National League (*abbrev.*).
27. To change the sound track on a film. (Rhymes with *rub.*)
28. Noah's boat. 30. Shade tree.
31. Take part in a play.
33. Anti-Aircraft (*abbrev.*).

Answers this week in Teacher Edition; next week in your edition.

Answers to last week's Quiz-word Puzzle

ACROSS: 1-brown; 6-perfect; 8-go; 9-R.I.; 11-adds; 14-spot; 16-sap; 17-pot; 18-medal; 20-sparrow; 22-no; 23-rye; 24-oh; 26-any; 28-are; 29-get; 31-elk; 32-trill; 34-yam.

DOWN: 1-be; 2-R.R.; 3-of; 4-we; 5-N.C.; 6-pods; 7-trot; 8-Ga.; 10-it; 12-damp; 13-spear; 14-spare; 15-polo; 19-dry; 20-song; 21-work; 22-N.A.; 25-he; 27-yet; 28-all; 30-try; 31-elm; 33-Ia.

SOME FUN!

Wrong Direction

Captain: "I'm happy to report we are only one mile from land."

Passenger: "That's funny. I don't see any land."

Captain: "I know. I mean straight down."

Gerald Wheeler, Hillcrest School, North Bend, Ore.

Watch Your Step

Jim: "Why don't you look where you're going, Ben?"

Ben: "I do, but that time I didn't go where I was looking."

Melvin Mitchell, Anna T. Jean School, Fairhope, Ala.

Far-Seeing Witness

Lawyer: "You say that you were about thirty-five feet away from the scene of the accident? Just how far can you see clearly?"

Witness: "Well, when I wake up in the morning I can see the sun, and they tell me that's 93,000,000 miles away."

Rick Gerhard, South Jr. H. S., Kalamazoo, Mich.

Constant Companions

Joe: "Did you fish with flies?"

Pete (just back from camping trip): "Fish with them? We fished with them, camped with them, ate with them, and slept with them."

Daphne Wood, P. S. 29, Staten Island, N. Y.

Joke of the Week

Before the fallen pillars of an ancient Greek temple, a teen-aged tourist posed for a snapshot. "Please don't get my ear in the picture," she said, "or my father will think I ran into the temple."

Billy Ray Williams, Rte. 3, Florence, Miss.

In the Future

Sally: "What's always coming but never here?"

Bill: "I don't know, what?"

Sally: "Tomorrow."

Sonja Frick, Marlin (Wash.) School

Old Acquaintance

Big Brother: "Go ask Mother if we can go to the movies."

Little Sister: "You ask her; you've known her longer than I have."

Dorothy Anne Phillips, Creswell School, Shreveport, La.

Sales Talk

A vacuum cleaner salesman scattered a sack of dirt on the best rug in the farm house parlor.

"Madam," he said to the lady of the house, "I will eat every bit of the dirt this wonderful electric sweeper won't pick up."

"I'll get you a spoon, then," said the housewife. "We haven't any electricity here."

Mary Crocker, 2308 Carleton, Shreveport, La.

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Off the Press

Extracurricular Activities, by Harry C. McKown. Macmillan, N. Y. 666 pp., $5.00.

The time is long since past when extracurricular activities in our high schools are viewed as newfangled fads and frills. There is still, however, abundant room for improving the activities which have gained a place in the secondary schools but are frequently imposed on teachers and students because it is the thing to do.

Dr. McKown, editor of *School Activities* magazine, is familiar with practices in extracurricular activities all over the nation. He keeps his feet on the ground and his sights on a workable program in chapters on the home room, student council, assembly, dramatics and music, clubs, athletics, school trips, school publications, and financial administration.

Dr. McKown has strong opinions, most of them fortified by experience. "The policy of excusing students from the home room to run errands," he states, "is about the most stupid thing imaginable."

There is little theory and much emphasis on the practical. Teachers and supervisors may gain a better perspective of what they are doing extracurricular-wise by consulting this sound volume.

The American Record in the Far East, 1945-1951, by Kenneth Scott Latourette. Macmillan, N. Y. 208 pp., $3.

Professor Latourette of Yale is at home in the Far East because of years of travel and residence there. In attempting a dispassionate survey of our record, he is performing a public service for the general reader.

The opening chapter provides the historical background, particularly since 1898, for our economic and cultural ties to the Far East. Latourette keeps an eye on Western Europe in explaining our foreign policy since the end of World War II. He is severely critical of Russian foreign policy, but has not given up hope for a peaceful solution to the present impasse. There are brief chapters on India, the smaller countries of southeast Asia, the Philippines, and Korea.

Much of the book describes our relations with China and Japan since the end of the war. Latourette is tolerant of the mistakes of our policy-makers and makes a conscious effort to be balanced in evaluating personalities. For example, he writes that "In General MacArthur the occupation had a director who in a remarkable way met the need of the Japanese at that particular time." Elsewhere he writes of MacArthur's dismissal, "President Truman . . . counted on the calm judgment of the majority eventually to rally to him."

This is not a book for scholars, but they will respect Latourette's optimism since it is based on long study of eastern Asia and a historian's perspective.

A Documentary History of the United States, by Richard D. Heffner. Paperbound edition, The New American Library, N. Y., 287 pp., 35¢. Hardcover edition, Indiana University Press, Bloomington, Ind., $3.

This is one of the first efforts by a university press to publish simultaneously a hard and soft covered edition of a book. The title is a good choice from the viewpoint of history teachers, because we need an inexpensive collection of documents from American history for superior students.

This volume is not as comprehensive as Commager's *Documents of American History*. It does offer a broad selection including the Declaration of Independence, the Constitution, *The Federalist*, Number 10, by Madison, Washington's Farewell Address, several Supreme Court decisions and Presidential inaugural addresses, one of the Turner essays on the frontier, the Cross of Gold speech, and the Marshall Plan.

It is unfortunate that the introductions to the selections presuppose a considerable knowledge of American history and will tend to confuse rather than assist the high school student who is unaccustomed to primary sources. But the documents themselves are worth the price of admission.

Forces Affecting American Education. 1953 Yearbook. Association for Supervision and Curriculum Development. A department of the National Education Association, Washington 6, D. C. 208 pp., $3.50.

Yearbooks are usually tame affairs. Not this one. The educators have decided to hit hard at the pressure groups which are seeking to undermine public education. They promise to gain the support of the great American public interested in fair play in the fight against the "self-appointed and self-annointed" cliques whose main weapons have been the big lie, . . . and financial support from those who "would push the schools back to the horse and buggy days."

Obviously, teachers alone are not going to be successful in winning the fight for public education. Willard Goslin, in "The People and Their Schools," observes that "The schools are at the center of nearly all the bitterly contested issues in American culture. . . . What happens to education will depend on how much of the power of the people is brought to its support." In "Groups Affecting Education," Robert Skaife names the enemies of education and suggests ways of identifying and combating them. He names the friends, too.

The power of mass media in affecting education is considered by Harold Benjamin. He notes that "The story of a psychopathic mother, striking an elementary school principal and breaking his glasses, is splashed over the front page with pictures . . . while the annual report of the president of the state Congress of parents and teachers is buried next to the stocks and bonds on page 17." There are, however, many newspapers, particularly in small communities, which give fuller and more sympathetic coverage to the schools.

Many of the attacks on the schools, particularly the lament about the passing of the Three R's, are based on little information. William Van Til shows how research can be a force affecting education. We must make clearer to the public that what we are doing is based on serious study, and that comparisons between the old and new ways of teaching children show that we are on the right track.

Within Our Power. Perspective for a Time of Peril, by Raymond B. Fosdick. Longmans, Green & Co., N. Y. 114 pp., $1.75.

If you are in one of your blue moods, this may be the book for you. Raymond Fosdick, retired head of the Rockefeller Foundation, offers us his philosophy of life. And it is a philosophy of hope. Much of his inspiration he derives from Woodrow Wilson with whom he was closely associated as Under Secretary of the League of Nations. He thinks of Wilson as an Isaiah whose message of reassurance for the oncoming generation was: "Say to them that are of a fearful heart: Be strong. Fear not." It is against fear that Fosdick inveighs in some of the most exalted paragraphs that have appeared in recent writing.

Freedom is being stifled, writes Fosdick, by the fear of atomic war, communism, and the "mood of violence" which has remained with us since the end of World War II. But he is not discouraged. Although our progress in human relations has not kept pace with scientific advance, Fosdick believes that there is still time. "If enough people are aroused to the menace [of a national breakdown], then the basis for some protective action can be laid."

—Howard L. Hurwitz